

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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CONTENTS

	PAGE
Editorial Comment	
Paris Aero Show	763
Ninth International Aero Exhibition, Paris	765
Paris Aero Show: The Exhibits	766
Light 'Plane Clubs	777
Short Brothers and Metal Construction	778
Sir Samuel Hoare on the Government's Air Policy	779
The D.H. 54 Commercial Biplane	780
Personals	780
Society of Model Aeronautical Engineers	780
Side-Wind	780

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1924	
Dec. 5-21	Paris Aero Show.
Dec. 12	Commander J. C. Hunsaker (C.C.), U.S.N., Assistant Naval Attaché to the American Embassy, London: "Notes on Seaplane Design," before I.Ae.E., Kingsway Hall.
Dec. 18	Mr. A. R. Watson Watt (Superintendent, Radio Research Board Station): "Recent Studies on Radiotelegraphic Atmospherics," before R.Ae.S.
1925	
Jan. 9	Mr. R. J. Parrott, Hons. Member: "The History and Evolution of the Avro Training Machine," before I.Ae.E.
Jan. 23 ...	Lieut. N. A. Olechnovitch, Member: "A Few Experiments with Shock-Absorbing Hulls for Flying Boats," before I.Ae.E.
Feb. 5	Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., A.F.R.Ae.S.: "The Operation of Flying Boats in the Mediterranean," before R.Ae.S.
Feb. 6	Professor E. G. Coker, D.Sc., F.R.S.: "Photo-Elastic Methods of Measuring Stress," before I.Ae.E.
Feb. 19	Major R. V. Southwell, A.F.R.Ae.S. (Superintendent, Aerodynamics Department, National Physical Laboratory): (Title to be announced later), before R.Ae.S.

EDITORIAL COMMENT.



Paris
Aero
Show

HERE can, we think, be no question that the Paris Aero Salon this year is considerably more interesting than have been, at any rate, the last two or three shows held in the Grand Palais. Not only is there a considerable number of new machines, but a close inspection of the exhibits indicates that there has been more *real* progress. This is doubtless due to the fact that it is now two years since an aero show was held in Paris, and that, therefore, constructors have had an opportunity to study their machines and designs and to effect improvements for which intervals of one year are often insufficient. As always, the exhibition is very beautifully arranged, and the stands seem more crowded than ever. It is regrettable that but one British aeroplane is on view, but Air Ministry restrictions on the types that may be publicly exhibited, combined with the difficulty of securing really good positions, is mainly responsible for this, and not any fear, on the part of British designers, of comparison with the machines of other countries.

One very noticeable feature of the Paris Show is the increasing popularity of the type which has come to be known in France as a *Sesquiplan*—i.e., a one-and-a-bit plane. The type was, if we remember, first developed by M. Delage of the Nieuport-Astra Company, whose racer won the Coupe Deutsch. Since then, not only M. Delage but a large number of other French, and several foreign, designers have adopted this type, whose main object is, of course, to put it very briefly, to combine the aerodynamic efficiency of the monoplane with the structural lightness of the biplane. Variations of the type are numerous, but all have the feature of a large top plane and a smaller (sometimes a little and sometimes a very much smaller) bottom plane. In some machines the bracing struts pass through the lower wing, while in others they stop at the lower wing and are continued below it in the form of under-carriage struts. This is particularly the case in twin-engined machines, where the two engines are usually placed on the short lower wing roots. To show how the sesquiplan idea

is spreading, it may be mentioned that the following constructors incorporate this feature in some of their machines: Bréguet, Farman, Fokker, Latécoère, Delage (Nieuport-Astra), and Potez. Even the Armstrong-Whitworth "Siskin" can almost be said to belong to this type, its lower wing being of much smaller dimensions than the upper, although in other respects, such as form of wing bracing, etc., it is a normal biplane.

Metal construction is making headway, although perhaps less rapidly than in previous years. On the other hand, such progress as is to be found is, generally speaking, of a more sound character than has sometimes been the case in the past, and methods are in process of being evolved which certainly seem to British eyes far in advance of some of those in vogue a few years ago. Duralumin is still the favourite metal with French designers, and we have not seen a single French machine in which steel was employed to any considerable extent. The two Dutch designers, on the other hand, employ it extensively in their fuselages, Fokker in the form of welded steel tubing, and Koolhoven the same, except that he avoids any use of welding and employs a special form of tubular rivetting instead. The French designers prefer aluminium alloy, usually Duralumin, but occasionally other forms, possibly because the material is obtainable in France, while high-grade steel in thin sheets has to be imported, mainly from England, and thus is probably nearly as expensive as Duralumin. Unanimous as the French designers are in their choice of material for metal aeroplanes, they have very differing ideas on the subject of how to use it, and scarcely any two of them employ the same form of construction. It is noticeable that although for small wing spars, for instance, such as the rear spars of biplanes, the plain box-section Duralumin tube is still popular, the front spars are usually built-up, and the manner of building them varies greatly. Corrugated flanges, such as we employ in steel spars, are becoming more used, and the plain built-up box section is gradually being replaced by other forms capable of approaching closer to the ideal of making full use of the strength of the material.

While on the subject of metal construction, it may be mentioned that the metal propeller is also coming into vogue, although the old laminated wood propeller is still in a large majority. The metal propellers are usually of the Curtiss-Reid type, the French rights for which have been obtained by Pierre Levasseur, but the Nieuport-Astra firm have recently produced a quite novel propeller, made of steel tubing, which may possibly be developed into a variable pitch airscrew (at present it only has adjustable pitch, *i.e.* the pitch cannot be altered during flight), and may ultimately be found to offer a solution of the problem. At the show one such propeller is fitted on a Nieuport-Delage machine, and a second specimen, resting on a table, was lifted and not found unduly heavy, in spite of the fact that its sections are, of course, solid steel. It is claimed that the balancing of an airscrew made on this principle is facilitated by the peculiar shape, and also that actual tests have shown the aerodynamic

efficiency to be good at high speeds. There is no doubt that unless reduction gears are fitted in the future on high-speed engines the propeller problem will become a serious one, and already great difficulty has been found in getting the old type of laminated wood propeller to stand up at the high speeds now met with, and there is every indication that matters are likely to get worse in this respect.

From the point of view of commercial aircraft the Paris Show is disappointing. It is true that the contraptions seen at some of the previous shows, in the form of most luxuriously appointed saloons built into very primitive aircraft, are happily absent from the present one, but there is still no sign of the really commercial aeroplane being in sight, or even any indication that we shall ever get it. The power expenditure per passenger carried is still far too high, and of attempts to reduce it without sacrificing too much in the way of performance there is little evidence. Yet there is no doubt that it can be done and will be done sooner or later, but constructors are not yet worrying over much about it so long as orders are to be obtained for military machines, for which a high price can be charged.

Seaplane work seems to be very much where it was two years ago, and much the same types of machines are being shown. The C.A.M.S. twin-engined flying boat is a very nice piece of work, but it is scarcely new and has already been described and illustrated in *FLIGHT*. One machine which does strike a new note, although strictly speaking it is not a seaplane at all, is the Pierre Levasseur biplane, which has, M. Charles Frechet informs us, been designed to give the Navy a two-seater with a performance approximately equal to that of the usual land machine, but capable of remaining afloat should engine failure or any other cause bring it down in the water. This machine has a watertight fuselage, with the bottom of V shape as in some flying boats. The undercarriage struts fit into forks on the fuselage, pointing downwards, and the single-bay lateral bracing can be released by a cable running to a lever in the pilot's cockpit. As soon as the bracing wires are slack the struts slip out of their forks, and the whole undercarriage falls into the sea. The machine then alights very much as would an ordinary flying boat, the lower plane being placed halfway up the side of the body so as to be clear of the water. An ingenious device enables the pilot to stop the engine in such a manner as to bring the propeller into a horizontal position. The idea is excellent, and might with advantage be developed on our side of the Channel also.

It had been expected that probably the light aeroplane would be well represented, but actually there are but two specimens in the show. One of these is a Dutch monoplane of very pleasing lines and fitted with an Anzani three-cylinder "Y" type engine, and the other is a Dewoitine, with six-cylinder-in-line water-cooled Vaslin. The Dewoitine is similar to the familiar types, but the engine seems to have points of interest and should run particularly smoothly.

"FLIGHT" AT THE PARIS AERO SHOW

Arrangements have been made for *FLIGHT* to be on sale in the Grand Palais during the French Aero Exhibition. Our stand is in the gallery, at the Champs-Elysees end of the building, and visitors wishing to leave messages relating to Editorial or Advertising matters should hand them to the Attendant.



THE NINTH INTERNATIONAL AERO EXHIBITION, PARIS : Two general views of the Grand Palais, showing the striking scheme of decoration (carried out in yellow and blue), which combines beauty with utility. In the top view (looking south) will be discerned the Armstrong-Whitworth "Siskin" F.B.A. flying boat, etc. Below (which is looking north) will be seen the S.I.M.B., Latecoere, Capt. D'Oisy's Bréguet, etc.



THE Ninth International Aero Show in Paris is one of the largest—or, at any rate, one of the most crowded—exhibitions which we can call to mind. Without having taken the trouble to count every machine on view in the various sections—in itself quite a formidable task—it is quite obvious that, as we suggested, the result of a two years' "rest" has been beneficial in every way, and that French constructors were right when they decided not to hold an aero show in the Grand Palais in 1922. Exhibiting in Paris—or anywhere, for the matter of that—is an expensive business, and the fact that at many previous shows there has been but little real progress has, we firmly believe, been largely due to the frequency with which the French exhibitions were held. This year, after an interval of two years, manufacturers have had time to carry out development work, to get ready machines which in most cases have passed the experimental stage and are obviously, with perhaps one or two exceptions, practical propositions. Consequently, there is, one might almost say, a "sanity" about the exhibition which has sometimes been lacking in the past.

This is not to be taken to indicate that constructors have run out of ideas, for, as a matter of fact, several new developments are to be found. Rather, we think, does it mean that constructors as a whole have realised that there is no short cut to efficiency, and that to elaborate non-essentials before the machines themselves had reached a sufficient stage of development was very much in the nature of putting the cart before the horse. Consequently, one does not find at this year's show luxuriously furnished saloons fitted into very primitive aeroplanes, such as was often the case shortly after the War, when many made the mistake of thinking that the "commercial" aeroplane was immediately realisable by that method. Since those days we have had some experience of commercial aviation, and there is evidence that the lesson has not been altogether in vain. For all that, however, it cannot truthfully be said that much progress has been made with the commercial aeroplane, nor even that the show bears evidence that *any* progress at all has been made. As a matter of cold fact, unpleasant though it may be, the ideal commercial aeroplane, using the term to indicate a machine having any possibility of paying for itself in ordinary commercial use, seems still a long way off, and there is still far too much tendency to expend 60 to 70 or more horse-power for each paying passenger carried. Farther than that we do not seem to have got. In view of the feats of economy performed by German designers (who have produced machines in which the power expenditure does not exceed 25 h.p. per occupant carried), this state of affairs cannot be regarded as other than disappointing. Thus, as regards commercial aeroplanes, the Paris show cannot be said to be encouraging. It appears that constructors have either rested content with the usual high-power expenditure or else have left commercial machines severely alone.

In the military (including, of course, naval) class, however, there is real progress to be seen at the exhibition, as we hope to show in the following and subsequent notes, and the progress is no less real because it is in the nature of detail improvement rather than in radical departure from normal practice. The finish of all the machines is, as always, excellent. That one has come to expect from previous exhibitions in the Grand Palais, but we think that the *workmanship* (a vastly more important thing, and sometimes confused with finish) is this year considerably better, and the general standard of the machines shown is extremely high. As always, the exhibition is very well patronised, and one cannot help wishing that when, very occasionally, we do hold an aero show at Olympia, it would attract as great interest as does the French Salon. It appears that in Paris the interest in aviation is not confined to any particular class or age, but is quite general, and the comments which one overhears are, as a rule, very intelligent and often very much to the point. The French are very proud of their *aviation*, and take the trouble to keep themselves well informed on all pertaining to flying. With us the Navy has always been the pet of the people, and the R.A.F. has not yet attained that popularity which, obviously, the French *Service d'Aviation* enjoys. However, there are, fortunately, signs that this state of affairs will gradually change, and it may be hoped that when next we hold an aero show at Olympia the somewhat discouraging experience of past shows will not be repeated. One thing which, more than anything else, would tend to ensure success would be for the British Air Ministry to take the same attitude as as does the French, that of letting constructors exhibit their very latest types, and not machines that have been familiar to all for several years. It is not to be expected that the general public, nor, what is far more important, representatives of foreign nations, will trouble to travel to London in order to see machines with which already they are thoroughly well acquainted, but if it became known that constructors were to be allowed to exhibit their latest types the matter would assume quite a different aspect.

The Show was opened by M. Laurent-Eynac, Under-Secretary for Air, on December 5, and it will remain open until December 21.

On December 6, President Doumergue, accompanied by the Prime Minister, M. Herriot, and a distinguished party, made an extensive tour of the exhibition.

THE BRITISH SECTION OF THE AERO SHOW

As details of the British exhibits were given in last week's issue of *FLIGHT*, it is not proposed to give particulars here beyond stating that the stands are well arranged and, everything considered, fairly favourably well placed. The Armstrong-Whitworth Aircraft stand is, of course, the *pièce de résistance* as far as the British section is concerned, being in a good position, well lighted and, as it happens, not crowded by its neighbours. The "Siskin" is exhibited in skeleton, and the excellent workmanship put into the machine, as well as the splendid finish, are causing favourable comment. This idea of showing machines without the covering is one

that seems to be becoming increasingly popular, and it certainly has the advantage of enabling visitors to find out exactly how the machine is built, the constructional features and such other details as would be concealed by the covering. On the other hand, the absence of covering seems to tend to give an aeroplane an unfinished appearance, and we think the scheme adopted during the War, when captured German aeroplanes were exhibited at the Agricultural Hall, Islington, might with advantage be copied for show purposes. This scheme consisted in stripping all covering off one side, up to the centre line. Thus when viewing the machines from one



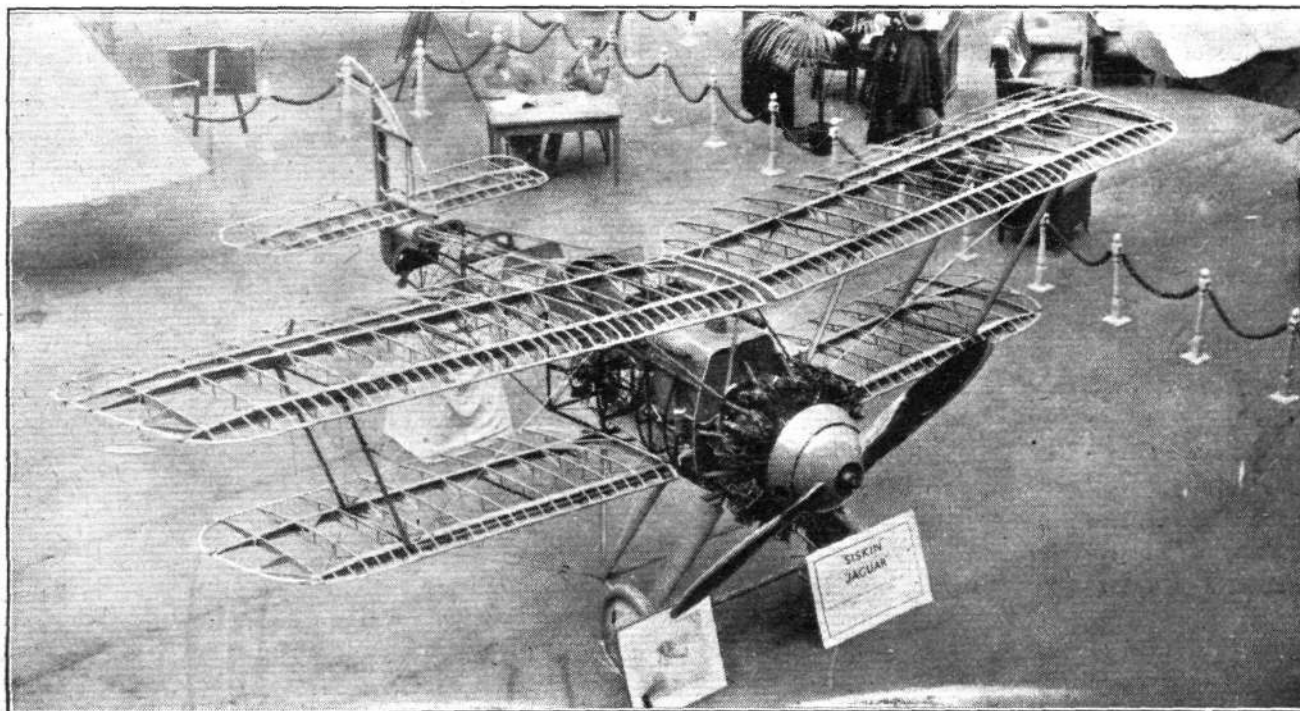
THE AIRCRAFT DISPOSAL COMPANY'S EXHIBIT AT THE PARIS SHOW : On the left is the 210 h.p. Wolseley "Viper" engine (behind, but hidden from view, is the 200 h.p. B.R.2 rotary) ; on the right is the famous 240 h.p. Siddeley "Puma," and in the centre are displayed various engine parts.

side one was able to form an excellent idea of its lines and proportions, while by walking around to the other side all the constructional details could be inspected. At the Paris show no machine, as far as we have been able to discover, is so exhibited, and we submit the method for the consideration of future exhibitors.

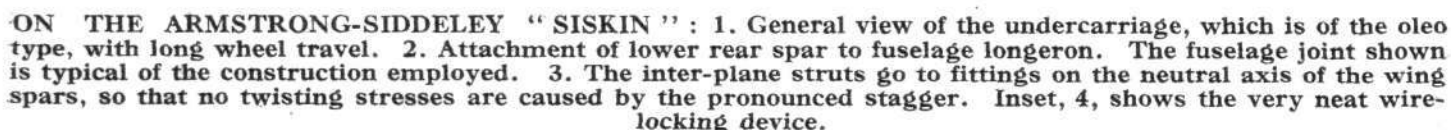
Opposite the Armstrong-Whitworth stand and under the gallery, is the Armstrong-Siddeley Motors stand, with the famous "Jaguar" and "Lynx" engines. These are mounted

on very substantial tubular frames, in fact from one point of view the supports are almost too solid, as they might, perhaps, convey the entirely erroneous idea that a structure of such proportions is necessary to support the engines. The stand is well arranged, and is, like the main stand, the subject of a great deal of attention from discriminating visitors.

A few "doors" up one finds the stand of the Aircraft Disposal Company, where, in addition to the three engines exhibited (a Siddeley "Puma," a B.R. 2, and a Wolseley



THE ONE AND ONLY BRITISH AEROPLANE AT THE PARIS AERO SHOW : A skeleton view of the Armstrong-Whitworth "Siskin 5" (Siddeley "Jaguar"). British aircraft construction is well represented and well displayed in this exhibit.



The remaining British stand, the "Bristol," is on the opposite side of the building, and shows a fine display of

Bristol engines, including the famous "Jupiter," the "Lucifer" and the "Cherub," as well as a Bristol gas engine starter. It is, of course, well known that the Bristol engines are now being manufactured under licence in France by the Gnome and Rhone Company, but it will probably be news to most of our readers to learn that arrangements have now also been completed for the manufacture of the "Jupiter" under licence in Italy and Czechoslovakia. We believe that in the case of the former country the agreement is with the government, and that it is intended to proceed without delay is shown by the fact that the Italian Government is planning to lay down a batch of 50 "Jupiters" at once, the first engine to be on the test bench within six months. That three

A black and white photograph of two large, complex mechanical engines on display. The engine on the left is labeled 'JAGUAR' and the one on the right is labeled 'LYNX'. Both are mounted on stands and have informational placards in front of them. The placards mention 'ARMSTRONG SIDDELEY MOTORS LTD'.



A FAMOUS BRITISH AERO ENGINE FAMILY AT PARIS : The 100 h.p. Bristol "Lucifer," the 450 h.p. Bristol "Jupiter," and the Bristol "Cherub" light 'plane engine—a range meeting almost all requirements.

countries, apart from Great Britain, are now building, or about to build, Bristol "Jupiters" is a considerable compliment to British designing skill, and is an achievement of which Mr. Fedden and the Bristol company in particular, and, indeed, the British aircraft industry in general also, may well be proud.

The only other British aero engine represented at the exhibition is the Napier "Lion." Fitted in the Fokker D. XIII, the famous Napier engine is, needless to say, the object of many enquiries, and the fact that the well-known Dutch aircraft designer has chosen the "Lion" for his

latest two-seater fighter is naturally taken as an indication of the esteem in which the Napier is held. It is rather a curious coincidence, and may be taken as being significant, that the two Dutch machines shown (the stands are next to one another) are both fitted with British engines, the Fokker, as already mentioned, with a Napier "Lion" and the Koolhoven with a Bristol "Jupiter" (French-built). It is to be regretted that the remaining British aero engine firm, Rolls-Royce, is not represented, otherwise there would have been in the Paris show specimens of all the modern British aero engines.

SOME OF THE FOREIGN MACHINES DESCRIBED

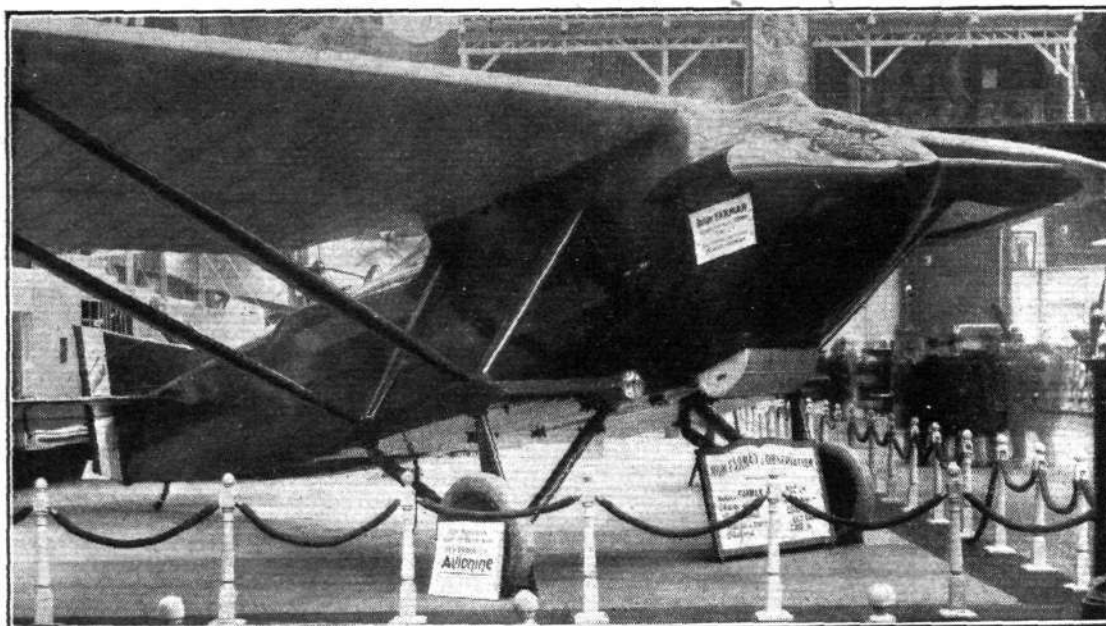
SPACE does not permit, nor do many of the machines exhibited merit a detailed description, but in the following notes, and in a subsequent article to be published next week, it is proposed to deal with such of the machines as are new, or which have, at any rate, been developed to such an extent since the last Paris Aero Show as to be virtually new types, or which for other reasons appear of special interest:

CHANTIERS AERO-MARITIMES DE LA SEINE
As in previous years, our old friend Lawrence Santoni is exhibiting a flying-boat of the type which he and his chief

designer, M. Conflenti, have developed during the last two years or so. This machine is known as the type 33 B, and is a twin-engined flying-boat with the two Hispano-Suiza



AT THE PARIS AERO SHOW : The twin-engined C.A.M.S. 33 B flying boat (Hispano-Suiza engines), designed and constructed by Chantiers Aero-Maritimes de la Seine.



Super-streamlining at the Paris Aero Show: The 500 h.p. Farman fighter, a sesquiplan in which streamlining has been carried out to a high degree.

engines placed in tandem. In appearance the machine is typical of Conflenti design, and of very "clean" lines. The construction is very simple, and presents no unusual features, but a change is noted in the design of the step, which is no longer concave, as in the majority of the flying-boats of Conflenti's design. Presumably the fact that the machine is intended for work in the open sea is responsible for this change.

The C.A.M.S. 33 B is equipped with a particularly complete set of instruments and "gadgets," and carries, in addition to its bombs and machine-guns, a wireless outfit, multitudinous navigation instruments, etc. As a description and illustrations of the 33 B were published in *FLIGHT* a few months ago, it is not proposed to go into details, but the main dimensions and performance may be of interest: Span, 17.62 m. (37 ft. 9 ins.); wing area, 92 sq. m. (990 sq. ft.). Total loaded weight, 4,100 kgs. (9,000 lbs.). Speed at sea level, 175 km./h. (110 m.p.h.). Ceiling, 4,500 metres (14,700 ft.).

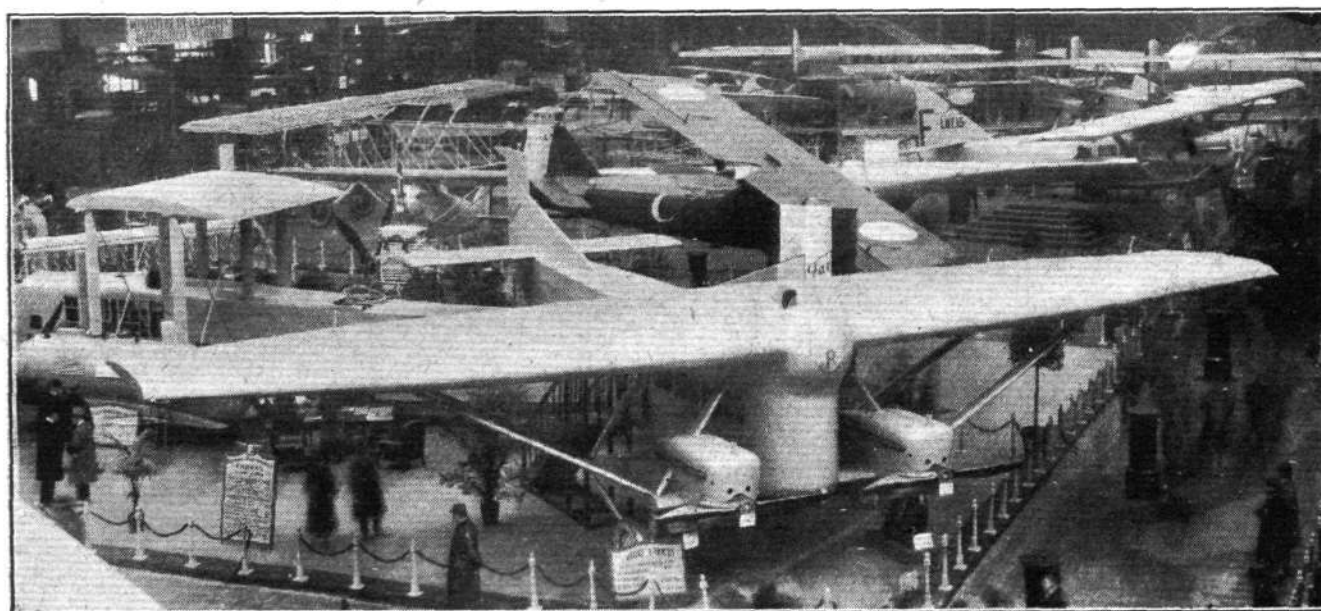
SOCIETE DES AVIONS HENRY AND MAURICE FARMAN

Two complete machines and the fuselage of a third are exhibited on the Farman stand. Of the two it is difficult to say which is the more interesting, and besides, in spite of the fact that one is a twin-engined and the other a single-engined

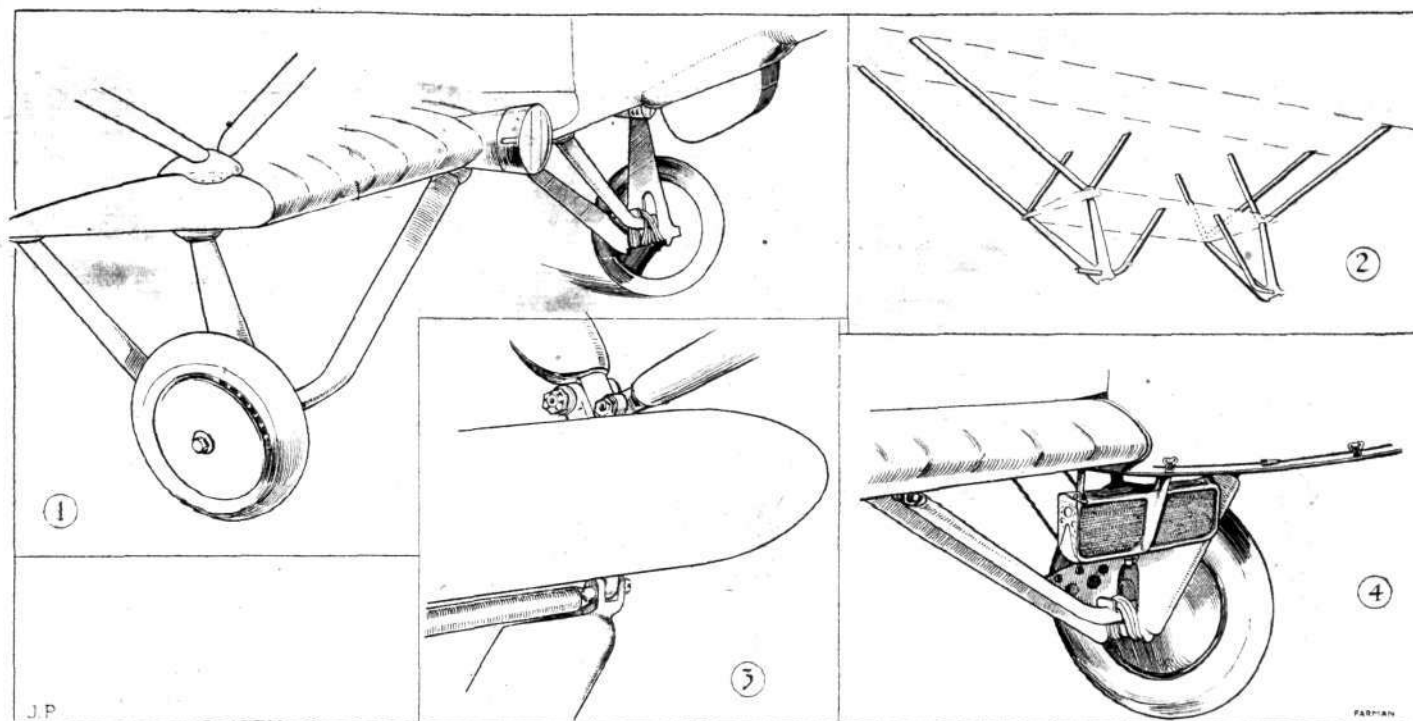
machine, there are many similarities between them. The one has the advantage of being proved, and of having to its credit the first prize in the last two Grand Prix for commercial aeroplanes, as well as more recently the Coupe Lamblin, while the other is an entirely new type. The former is the famous "Jabiru," photographs and a brief description of which have appeared in *FLIGHT*, and the latter is a two-seater reconnaissance biplane, or rather "sesquiplan," as the lower wing is of quite diminutive dimensions.

The "Jabiru" is, as is, of course, well known, a development of the F.3X with 180 h.p. Hispano-Suiza engines, which won the 1923 Grand Prix for commercial aeroplanes, but has been somewhat altered in various details, as well as having two 400 h.p. Lorraine engines substituted for the 180 Hispanos.

As exhibited at the Salon, the "Jabiru" is a high-performance passenger carrier, being provided with a comfortable saloon with seating accommodation for nine passengers. The leg-room provided appears to be ample, an important consideration for long journeys, but the machine scarcely impresses one as being a commercial proposition with a power expenditure of close upon 90 h.p. for each paying passenger. The Grand Prix, it may be recollected, was flown to a formula, in which speed played an important part, and if high performance is required certainly the "Jabiru" seems to score, as the maximum speed is given as 208 km./h.



FARMANS AT THE PARIS AERO SHOW: The large twin-engined (400 h.p. Lorraine) "Jabiru" commercial "semi-sesquiplan." Note the pilot's elevated position. It was this type of machine which won the last two Grand Prix competitions for commercial aeroplanes.



SOME FARMAN DETAILS : 1. General view of the undercarriage of the single-engined reconnaissance machine. Note the headlights in the leading edge, and the Lamblin radiator under the fuselage. 2. Diagrammatic perspective sketch of the system of bracing employed in the two Farman sesquiplans. 3. Wing strut attachments and undercarriage hinge on the Farman "Jabiru." 4. One side of the "Jabiru" undercarriage. Note the radiator position and the locking rod of the engine cowling.

(130 m.p.h.). The commercial cruising speed is stated to be 180 km./h. (113 m.p.h.), which, if correct, is also a very good figure, but the price paid for this high speed does appear somewhat high.

The cabin of the "Jabiru," as already stated, has room for nine passengers, a sofa along the front wall seating three, and the remaining six being single chairs. A small table is also provided on the starboard side.

The original "Jabiru" was fitted with three engines, two on the lower plane and one in the nose of the fuselage. The third engine has been removed in the show machine, and its place is taken by the pilot's cockpit, which forms a "bulge" in the leading edge. The view from the cockpit must be exceptionally good, and the pilot has the further advantage that he can see both engines. In plan view the "Jabiru" is not exactly a pretty machine, resembling as it does a sort of sting-ray with its monoplane wing of tremendous chord and fairly low aspect ratio. However there is no denying the efficiency of the machine, and appearances are, after all, a secondary consideration.

The two Lorraine engines are mounted on, but well ahead of, the short wing roots that give the machine its title of "Sesquiplan," and in this position they are fairly accessible for inspection or overhauls of a minor character. The wing bracing and undercarriage bracing struts all meet near the tips of the lower wings stumps, the whole being so arranged as to provide triangulation, as indicated in a sketch. Apart from these struts there is no external bracing, and in consequence the machine is of clean outline.

The main characteristics are as follows: Length o.a. 13.68 m. (44 ft. 9 ins.); wing span, 19 m. (62 ft. 2 ins.); wing area, 90 sq. m. (970 sq. ft.); weight empty, 3,200 kgs. (7,000 lbs.); useful load, 2,000 kgs. (4,400 lbs.). Total loaded weight, 5,200 kgs. (11,400 lbs.); wing loading, 11.8 lbs./sq. ft. Power loading (on 800 h.p.), 14.3 lbs./h.p. Maximum speed, 208 km./h. (130 m.p.h.); cruising speed, 180 km./h. (112.5 m.p.h.). Ceiling 4,250 m. (14,000 ft.).

The Farman two-seater reconnaissance machine is of the same general design as the "Jabiru" as regards its wing structure, which is of the sesquiplan type, with the wing and chassis struts forming the triangulated bracing. One of our photographs shows the machine, and will give a good idea of the general lines. According to the legend on a placard in front of the machine, this Farman is an *avion d'observation*, and a free view, coupled with a free field of fire for the machine-guns, is evidently the feature aimed at. At the same time good aerodynamic efficiency should be attained, as the lines are certainly very "clean." Just how one gets at the 500 h.p. Farman engine installed in the nose if a sparking plug requires to be changed is not at all clear, as the

engine is entirely cowled-in, with no visible means of removing the aluminium cowling. The film shown by Dr. Rohrbach before the Royal Aeronautical Society recently indicated that the most popular tool in Denmark is a hammer. Perhaps the favourite of the Farman mechanics is a tin opener! The machine is painted a sort of orange colour, and looks rather effective. The pilot is placed aft of the rear wing spar, the trailing edge being cut away so as to improve his view, while the gunner is, as usual, placed behind the pilot. Both should get a reasonably good view, the gunner on account of being placed far aft, and the pilot by virtue of the narrow, though long, fuselage deck in front of him. The machine is, we understand, an experimental one, and consequently the performance figures are presumably estimated ones. If they are realised in actual tests the machine should be a formidable opponent.

The engine fitted in the Farman reconnaissance machine is a 500 h.p. Farman, entirely cowled in, and as the Lamblin radiator is placed under the belly of the fuselage the nose itself is extremely clean, and finished off by a spinner on the propeller.

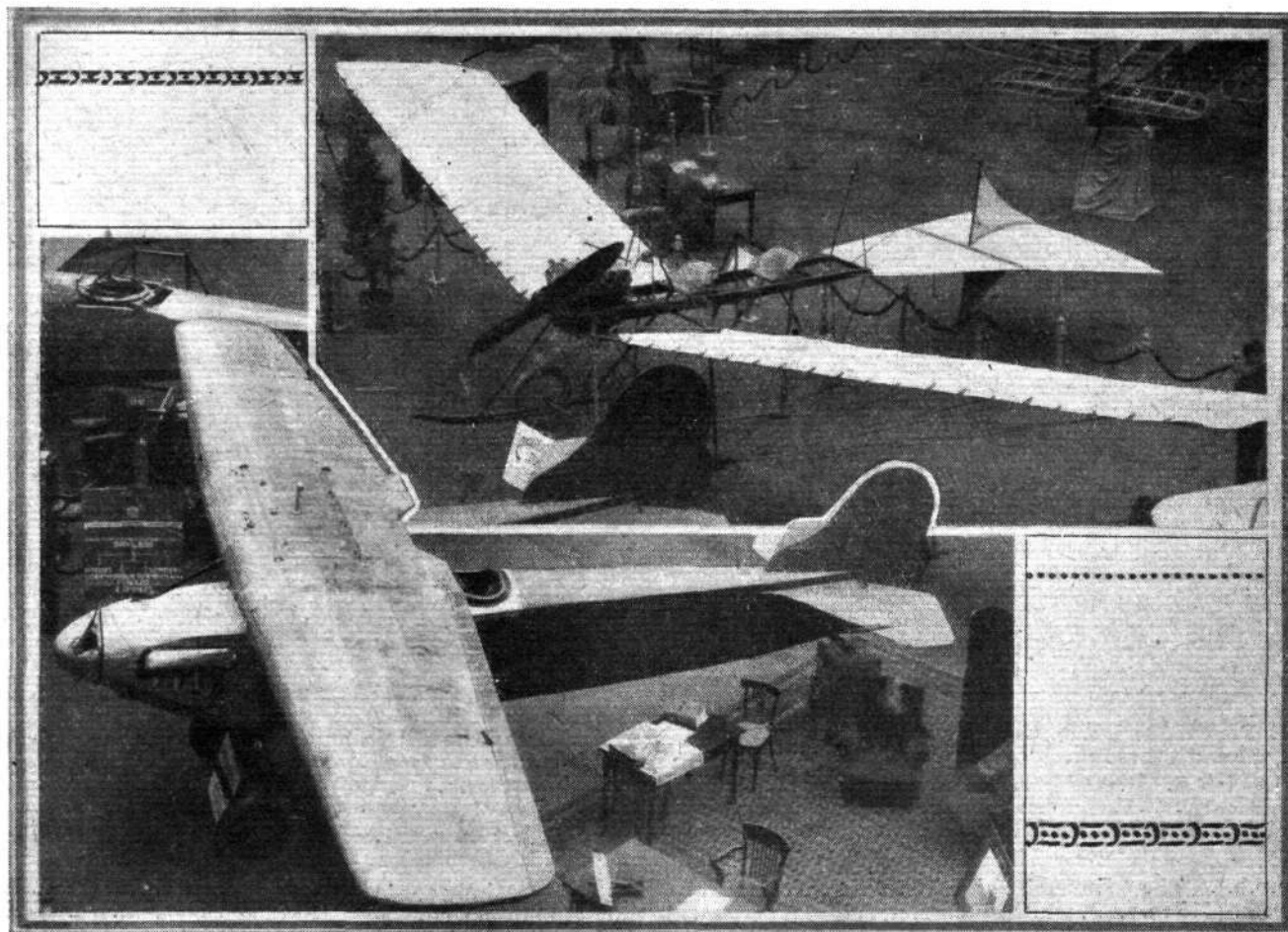
Following are the main dimensions, etc.: Length, o.a., 10.5 m. (34 ft. 5 ins.); span, 15 m. (44 ft. 2 ins.); maximum chord, 3.5 m. (11 ft. 6 ins.); useful load, 1,000 kgs. (2,200 lbs.); total loaded weight, 2,500 kgs. (5,500 lbs.); speed at 5,000 m. (16,400 ft.), 220 km./h. (137.5 m.p.h.); ceiling, 7,000 m. (23,000 ft.).

The fuselage and tandem engine units of a huge four-engined bomber (B.N.4) is also exhibited. This is equipped with almost every conceivable "gadget," and would gladden the hearts of some of the Air Ministry experts from the Technical Department. It is not proposed to give a description here, but it may be stated that the night-bomber is fitted with four 500 h.p. Farman engines, and has a total loaded weight of 11,000 kgs. (24,200 lbs.). Some idea of the size of this machine may also be formed from the fact that the wing span is 35 m. (115 ft.), and the wing area 266 sq. m. (2,860 sq. ft.). In spite of its size the Farman B.N.4 is expected to have a top speed of 165 km./h. (103 m.p.h.).

THE FOKKER MACHINES

Two machines are exhibited on the stand of the N.V. Nederlandsche Vliegtuigenfabriek (Fokker), one being one of the original Fokker monoplanes of 1912 or thereabouts. This machine is fitted with a Renault engine. By way of showing the progress made since those early days it would be difficult to imagine anything better than the placing side by side of this veteran and the latest Fokker single-seater fighter, the Fokker D.XIII with Napier "Lion" engine.

The D.XIII is a development of the D.XII exhibited at

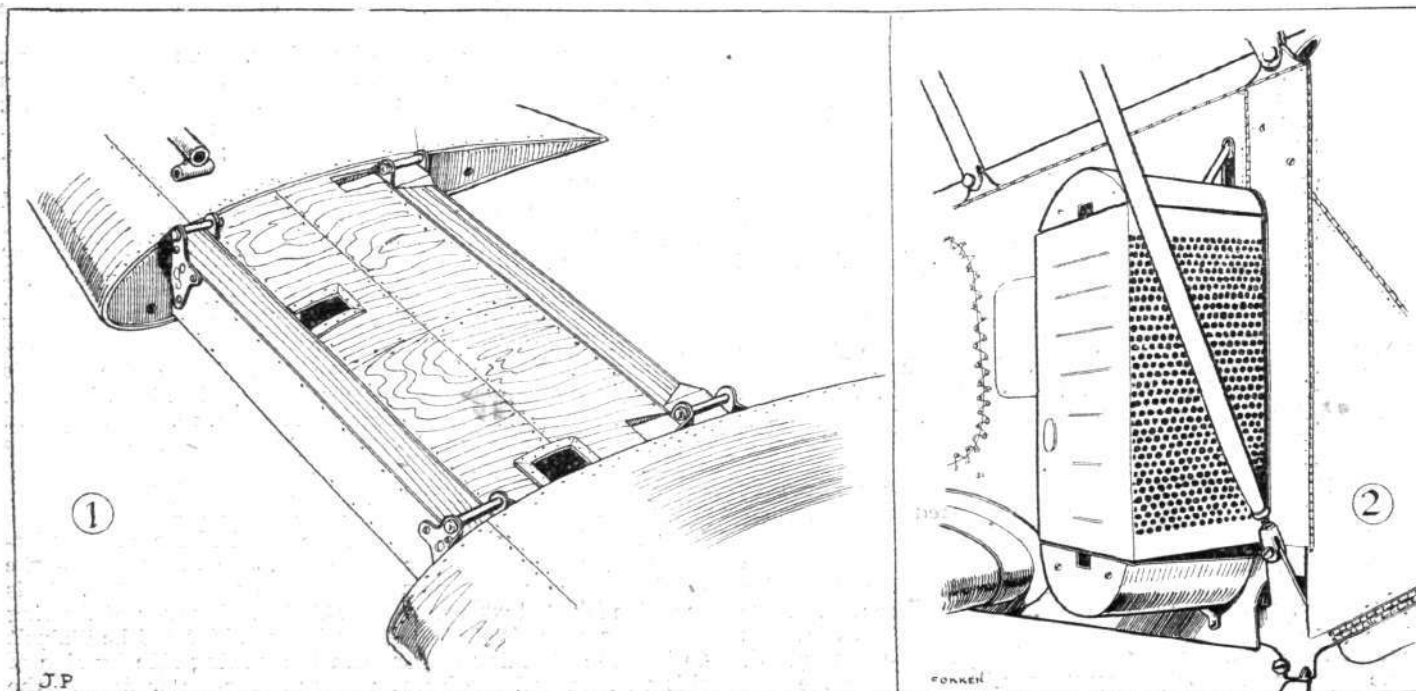


DUTCH MILESTONES AT THE PARIS SHOW : Alongside with the latest Fokker D XIII biplane—which is fitted with a Napier "Lion" engine—is exhibited the little wire-braced monoplane built and flown by Mr. Fokker in 1911. As will be seen above, Mr. Fokker believed in tubular metal construction even in those days.

Gothenburg last summer, and is of characteristically Fokker lines. The upper wing is large, of high aspect ratio and entirely constructed of wood, even to the wing covering, while the lower plane is of quite small dimensions, and serves mainly to steady the top plane against torsional loads, as, with the V struts running to the lower plane, any tendency to twist is resisted by the lower plane in drag. The top plane is carried on N-struts from the fuselage, and is braced laterally by a single outboard strut on each side. The lower plane, which, like the upper, is in one piece, slips into an opening in the sides

of the fuselage and is secured in place by four bolts, as shown in one of our sketches. The fuselage is the usual Fokker welded-steel tube structure with wire bracing.

The Napier "Lion" engine is neatly cowled in, the small overall size of the engine making this possible, and side radiators of a special type, capable of being withdrawn into the fuselage, leaving the nose free, enable a spinner to be used over the propeller boss. As the biplane wings are of the cantilever type, the V struts being, as already stated, for transmitting torsion mainly, the machine is very clean, and



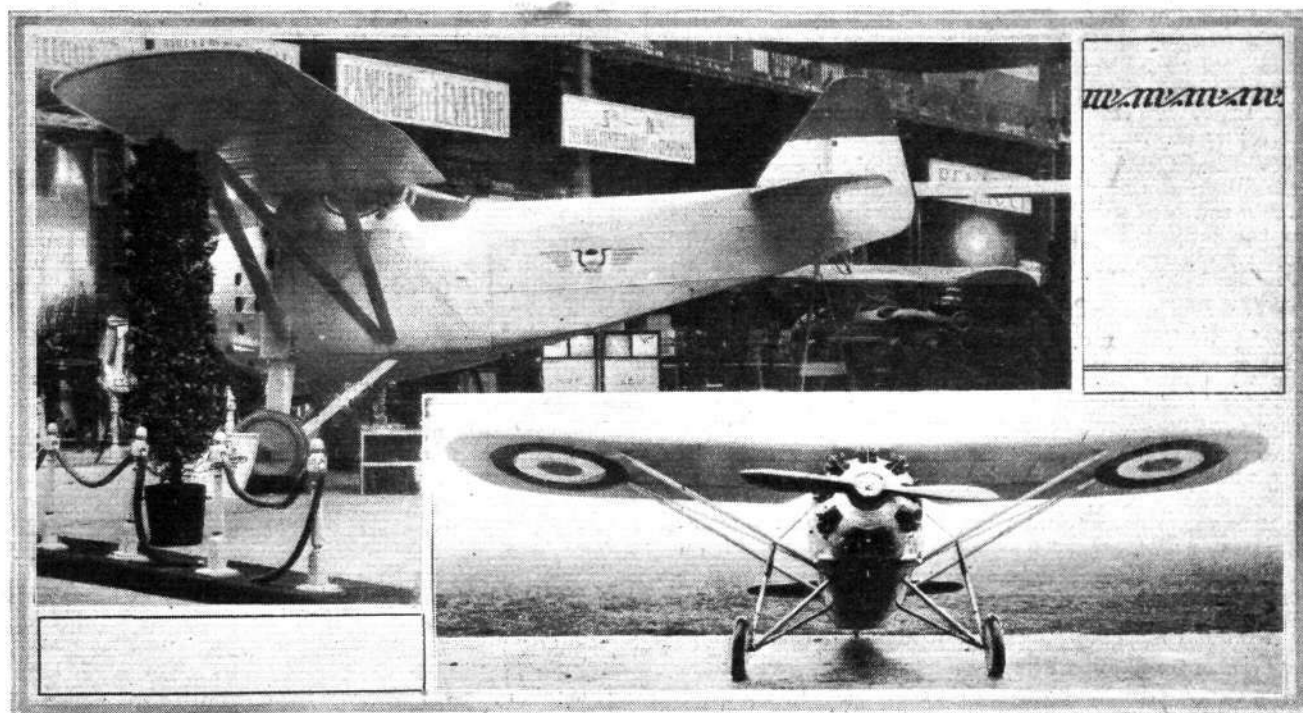
SOME FOKKER DETAILS : 1. View of the centre portion of the lower plane, showing fittings for attaching it to the fuselage. 2. One of the retractable radiators which are a feature of this machine.

its excellent performance bears out the impression of efficiency. The particular Napier engine used, by the way, has a compression ratio of 5.8 to 1, and the performance figures given below apply to the machine thus equipped.

The main dimensions of the Fokker D.XIII are: Length, o.a., 7.9 m. (25 ft. 11 ins.); height, 2.9 ms. (9 ft. 6 in.); span 11 m. (36 ft.); wing area, 21.47 sq. m. (231 sq. ft.); the weight empty is 1,180 kgs. (2,590 lbs.). The total useful load, composed of pilot, fuel for 2½ hours, guns, ammunition, etc., is 430 kgs. (950 lbs.), and the total loaded weight is 1,610 kgs.

THE KOOLHOVEN MONOPLANE

It may be remembered that at the last Paris Aero Show the Nationale Vliegtuigindustrie of The Hague, Holland, otherwise the Dutch company of which Mr. Frederick Koolhoven is technical director and Lieut.-Col. H. Walaardt Sacre managing director, exhibited a monoplane with Bristol "Jupiter" engine. Since then the machine has undergone considerable development, and as now exhibited, the F.K.31 is certainly an exceptionally fine two-seater fighter. It is, as the accompanying photograph will show, a parasol mono-

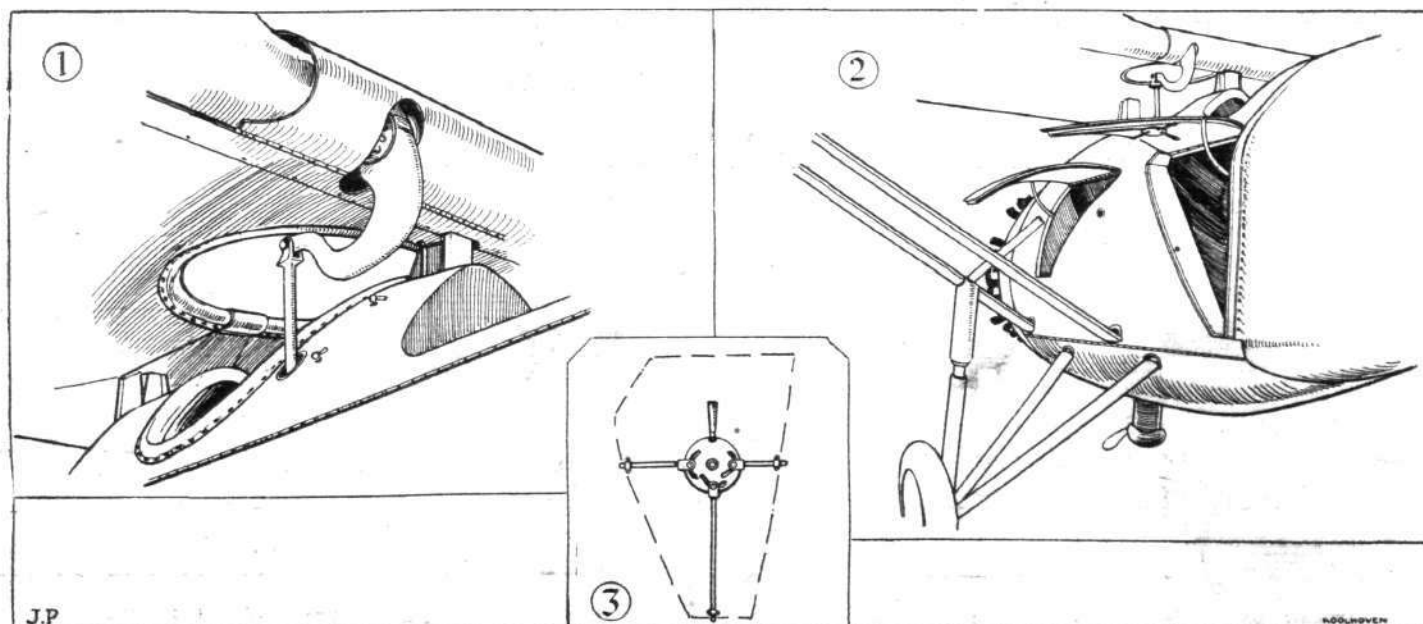


ANOTHER DUTCH EXHIBITOR AT THE PARIS SHOW: The F.K.31 two-seater fighter monoplane exhibited by the Nationale Vliegtuigindustrie, of which Mr. Frederick Koolhoven is technical director. Note the wide chassis, which is reminiscent of the B.A.T. machines.

(3,540 lbs.), giving a wing loading of 75 kgs./sq. m. (15.4 lbs./sq. ft.) and a power loading of 7.9 lbs./h.p. The top speed at ground level is 280 km./h. (175 m.p.h.). The machine climbs to 5,000 m. (16,400 ft.) in 12 minutes, and has a service ceiling of 8,000 m. (26,300 ft.). Its absolute ceiling is 9,500 m. (31,200 ft.). These figures are, we understand, those obtained on actual test flights, and not estimated figures, and if correct they are testimony not only to the power developed by the Napier "Lion" but also to the skill of the famous Dutch designer.

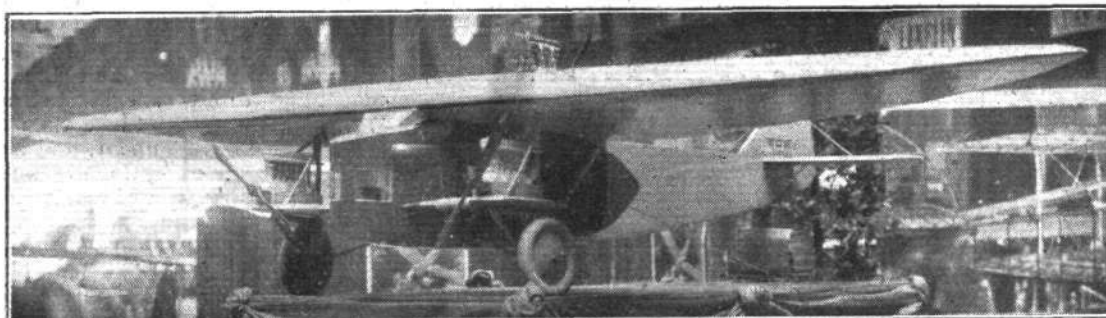
plane, with strut bracing and an oleo undercarriage giving exceptionally long travel—10 ins., to be exact. The engine fitted this year is a French-built Bristol "Jupiter."

The F.K.31 has a steel tube fuselage structure, but whereas Fokker uses welding for joining struts to longerons Koolhoven has developed a special form of joint employing tubular rivets, no welding being used for stressed parts. The formers or bulkheads of the fuselage are made of Duralumin, a special paint being used to insulate the two so as to avoid any electric action. The rear portion of the fuselage is fabric covered,



ON THE KOOLHOVEN F.K.31: 1. View, looking upwards, of the pilot's cockpit, circular opening in wing, and aileron crank. 2. Side doors give access to the cockpits of the F.K.31, a very neat locking device, shown in 3, securing the doors during flight. The oleo undercarriage has a travel of 10 ins.

One of the novelties of the Paris Aero Show : Model of the Koolhoven three-engined commercial sesquiplan. Two of the three Siddeley "Puma" engines are mounted on the short lower plane stumps and drive tractor air-screws, while the third engine, driving a propeller, is mounted on the top plane above the fuselage.



whereas the front part is covered with aluminium. Owing to the proximity of the fuselage deck fairing to the wing, entrance to the cockpits is gained by doors in the side, these forming the subject of one of our sketches. A special form of locking device has been evolved for the doors, by which the doors are kept quite light and yet are strong enough to form part of the fuselage structure. Three substantial rods or plungers are operated by a disc with eccentric slots, as shown in the sketch, and engage, when the door is closed, with the rest of the framework, one rod going to the bottom corner and the other two to the sides of the door.

Owing to the large cross-sectional area of the fuselage, there is unusually ample room in the cockpits, especially in the gunner's, who has plenty of room to move about in spite of the fact that his office is fitted out with three machine-guns, a large camera, wireless outfit, telegraphic as well as telephonic, ammunition, etc. The gunner's seat is mounted on a swivel, and can be instantly raised or lowered and swung to any position required. Two guns are mounted on a special support giving extremely free movement, and the third gun, used for firing downwards and aft under the tail, can quickly be swung out of the way and the camera brought into position above the opening in the floor.

The pilot, as is usual, operates two machine-guns, synchronised to fire through the propeller. In order to improve his view the monoplane wing is of thin section in the centre, and a circular opening is cut out between the spars, so that the pilot can see in practically all directions except straight down. It would be difficult to imagine a two-seater providing better view from both cockpits, while the equipment of the machine is such as to make the F.K.31 a formidable opponent. Included in it are a couple of pistols for firing Very lights, and as an instance of the thought that has been given to details, it may be mentioned that these pistols are permanently mounted in the fuselage and sighted in such a direction that the pilot or gunner cannot accidentally fire the lights into any part of the machine. The muzzles of the pistols project through small openings in the side, and the coloured lights are fired outward and downward. Dual controls are provided so that should the pilot be incapacitated the gunner can take control and bring the machine safely to earth.

The "Jupiter" engine is neatly cowled-in in so far as it is possible to enclose a radial air-cooled engine, and we noticed that Mr. Koolhoven had designed and fitted a special oil cooler projecting through the cowling under the engine.

In conclusion, it may be mentioned that the French rights

have been secured by M. de Monge, who will build F.K. 31's in France under licence.

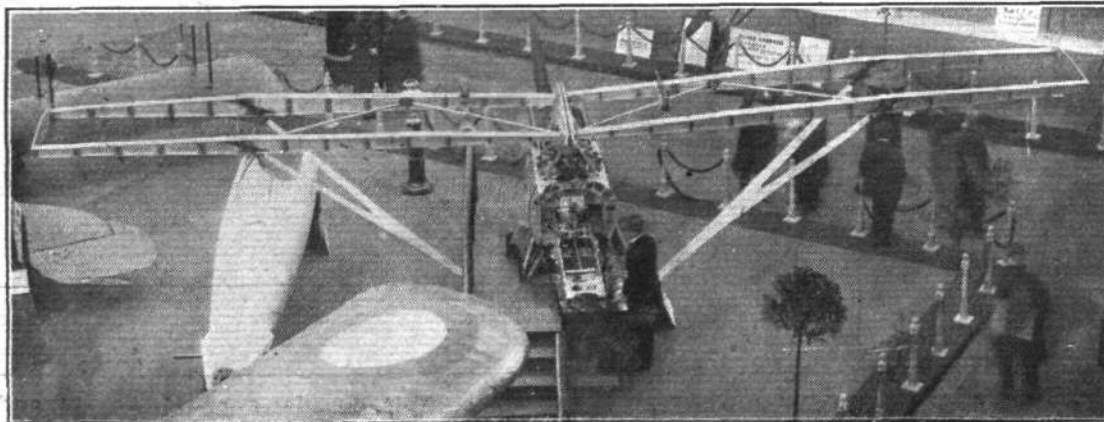
Mr. Koolhoven is also exhibiting a large scale model of a very interesting three-engined monoplane which is now being built at his works to the order of the K.L.M. This will be a large monoplane fitted with three Siddeley "Puma" engines, of which two are placed some distance out from the sides of the fuselage, while the third is to be mounted above the trailing edge of the wing. The placing of the three engines is such that with any one of them stopped the centre of thrust will not alter to any very serious extent, and it is thought that the machine will be able to fly comfortably on any two of the three engines. According to the scale model there will be seating accommodation for nine passengers, so that on this basis the power expenditure will be somewhat high—i.e., about 80 h.p. per passenger. However, the three-engined arrangement has been chosen to give immunity from forced landings, and we believe that in addition to the passengers there is lifting capacity for a fair amount of luggage and/or goods, so that actually the machine will probably be more economical than might be thought from the horsepower per passenger basis. It will certainly be interesting, and when the machine is completed we hope to be in a position to give a detailed description.

SOCIETE NIEUPORT ASTRA

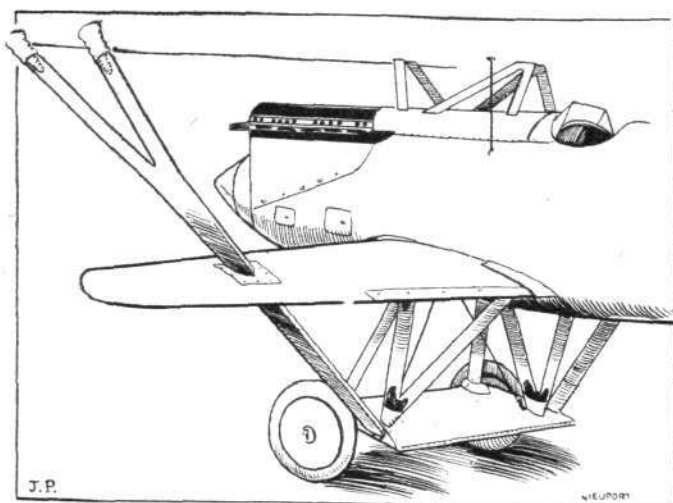
A VERY interesting stand this year is that of the French Nieuport firm. Not only is an entirely new type of aeroplane exhibited, but a metal propeller with adjustable pitch, and of unusual design and construction, is shown as well. At the time of writing it has not been possible to obtain particulars of the performance, etc., of the new Nieuport-Delage Sesquiplan, type 42 C2, but we hope to be in a position to publish these on a future occasion. In the meantime a few notes on the general design of the machine may be of interest.

The Nieuport-Delage type 42 C2 is, as the title implies, a two-seater fighter. It is also of the *sesquiplan* type which M. Delage has done so much to develop, and incidentally the machine provides a very striking example of the advantages of designing, constructing and flying racing machines. It may be recollected that a couple of years after the War the Nieuport firm entered a sesquiplan for the Coupe Deutsch, and that ever since they have continued to develop this type, at first side by side with their now famous type 29, and gradually to greater and greater extent until now it appears that the sesquiplan will entirely supersede the biplane.

The 42 C2, while obviously belonging to the sesquiplan



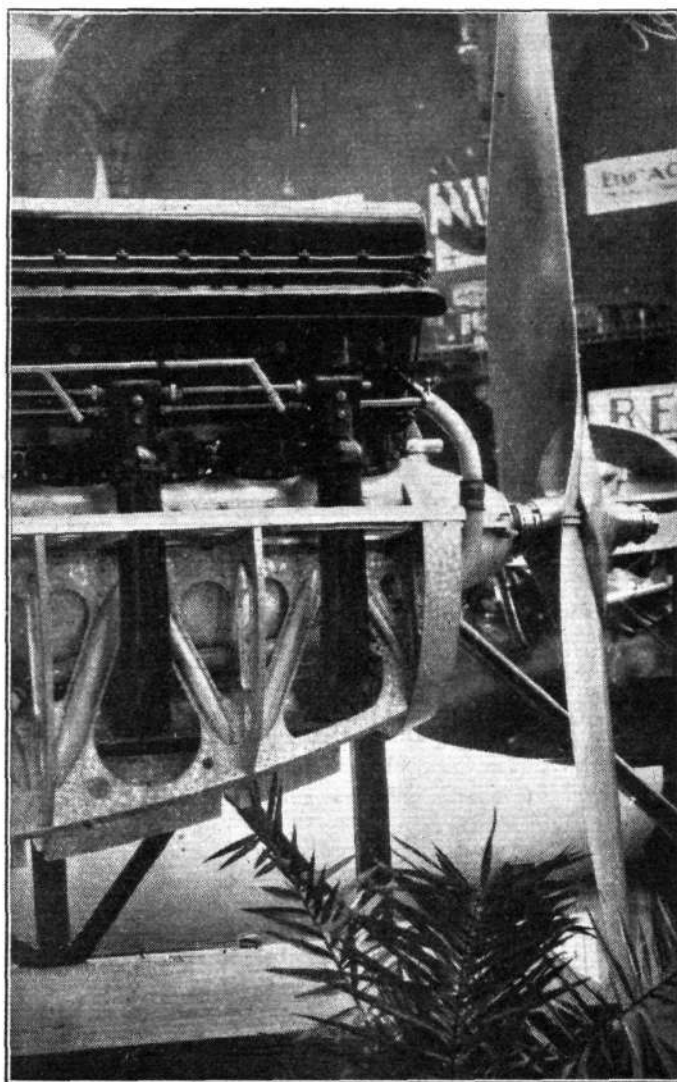
The Paris Aero Show :
The all-metal front unit of the Nieuport-Delage sesquiplan, consisting of the wing spars and the engine and pilot's section of the fuselage. The rear portion of the fuselage (which is of monocoque construction), as seen on the left, is attached as a second unit to complete the machine.



Three-quarter rear view of the Nieuport-Delage 42 C.2 sesquiplan, showing undercarriage and wing bracing arrangement. Lamblin radiators are fitted underneath the small lower planes.

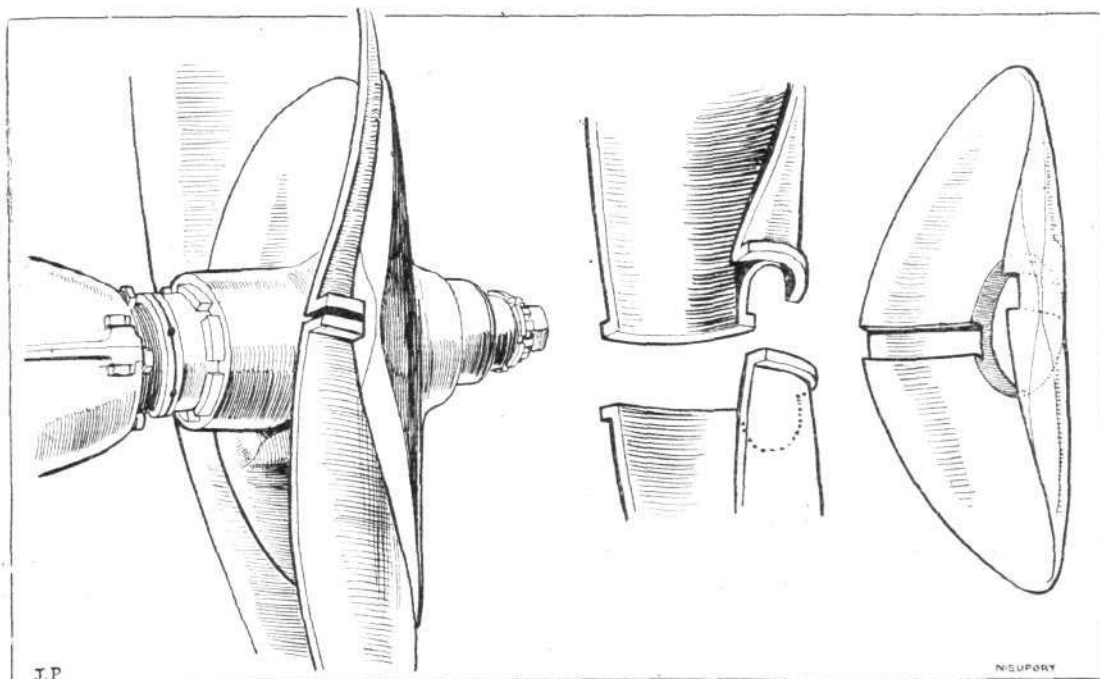
family, and being readily traceable back to the original sesquiplan racer, is a direct development of the 42 C 1, the main difference being the addition of a second cockpit for a gunner. Exactly how the presence of a gunner, with the fuselage swelling for gun mount, and the gun-ring and guns themselves, affects the performance is not known, but judging from appearances it would seem that a vast amount of resistance has been added and that the performance must have been seriously reduced. This is, of course, one of the reasons why the racing machine cannot be directly adopted as a fighter without loss of performance, but at the same time the beneficial effect of racing experience is obvious.

In the 42 C2 the pilot is seated immediately aft of the rear spar, nearly on a level with the wing, and the usual machine-guns for firing through the propeller are, of course, provided. It was noticed that a small mirror was placed on the cabane struts so that without turning his head the pilot can see what his gunner is doing. The rear cockpit is raised somewhat, the support for the gun-ring being built integral with the *monocoque* fuselage and forming a swelling or bulge on it. This, in conjunction with the two guns exposed to the air, naturally somewhat spoils the otherwise very clean lines of the fuselage, but is one of those necessary evils inseparable from military machines. The field of fire from the rear cockpit is particularly unrestricted, and as the machine is small and, presumably, very manoeuvrable, the 42 C 2 should be a very useful two-seater fighter.



An Adjustable Airscrew at the Paris Aero Show : A close-up view of the Nieuport-Delage adjustable-pitch airscrew.

The monoplane wing is supported in the centre by cabane struts, and some distance out by single "Y" struts, the upper



The Nieuport-Delage adjustable pitch airscrew is made from steel tubes of large diameter, cut in such a way as to provide the required taper in chord and change in angle of attack. Our sketches show how the two halves are joined together and locked by boss and front plate.



AT THE PARIS AERO SHOW : The S.I.M.B. racing monoplane. In this machine the new-type Lamblin radiators are mounted beneath the cantilever wings.

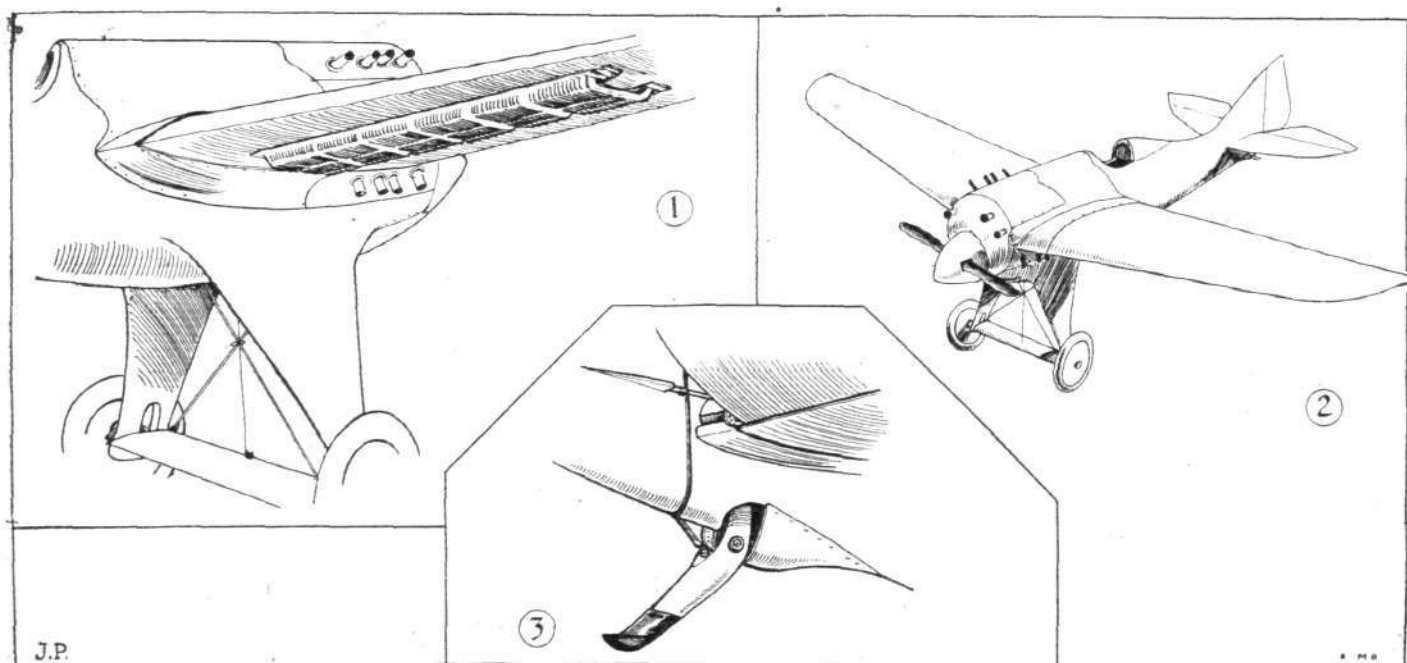
limbs of which support the top plane spars, while the lower, single, end passes through the small bottom plane and to the undercarriage. Lamblin radiators are fitted on the underside of the small plane, so that the nose of the fuselage, the engine cowl and the spinner form a very clean entry for the air. The engine fitted is a 450 h.p. Hispano-Suiza, of Vee type. The 42 C2 is illustrated by a photograph, and the undercarriage, as well as the wing bracing, etc., by a sketch.

A separate "Nose," with top wing spars in position, is also exhibited. This, it is stated, represents the 42 C1, but whether the same principle applies to the entire structure of the 42 C2 is not quite certain. The engine is mounted on an all-metal cradle, so designed as to slip into the open forward end of the wood monocoque fuselage. This is a form of construction recently developed by M. Delage, but in the 42 C1 he has gone a step farther and adopted metal wings. At least the two spars shown on the all-Duralumin fuselage portion are of Duralumin. No ribs are in place, but it is assumed that these will be of Duralumin also. The wing bracing struts, of the "Y" type, are also of Duralumin, with riveted leading and trailing edges. The general design of the metal engine cradle may be seen in one of our photographs. The whole forms a complete unit, and is slipped into the monocoque fuselage and riveted in place. The engine cradle also

provides the support for the seat, so that the monocoque fuselage is called upon to carry tail loads only. In the two-seater, the 42 C2, it is doubtful whether the metal structure can be carried sufficiently far aft to support the gunner's seat, and presumably this, therefore, is carried by the wood fuselage.

The Duralumin wing spars of the 42 C1 are of box section, and a form of laminated construction, similar to that of a laminated spring, has been employed to provide extra thickness of metal at the points of maximum stress. The spar construction itself does not seem to be particularly good, as the top and bottom flanges are perfectly flat, but zig-zag rows of rivets appear to indicate that the flanges are stiffened against secondary flexure by some internal members which cannot be seen and whose precise nature we were unable to ascertain.

The all-metal propeller to which we have referred is of very unusual form. Briefly, the principle is that the propeller is made in two halves, from circular-section steel tubing. The tube, in manufacturing the propeller, is cut through lengthwise in such a manner as to leave the full semi-circle at the root, and progressively less and less as the tip is approached. By suitably arranging the paths of the cut the propeller blade gradually grows narrower and narrower towards the tip, and



THE S.I.M.B. RACING MONOPLANE : 1. View of the undercarriage, Lamblin wing radiators, neat engine exhausts, etc. 2. Three-quarter front view from above. This sketch gives an excellent idea of the clean lines of the machine. Note the air intakes facing forward. 3. The tail skid, which is partly faired in, and an elevator hinge.

the two cuts are so arranged as to give the required angle of incidence at any point along the radius. It will be seen that near the boss the section of each blade is semi-circular, while everywhere the section is an arc of a circle, except for such small changes as are made while grinding down the thickness, when, presumably, it is possible to change the outer sections into something approaching a proper aerofoil shape. The roots of the two blades have shoulders left on their forward face so as to take centrifugal stresses, and the two halves of the propeller are locked by the propeller boss and by a plate on the front, as shown by our sketches. By undoing the nuts it is possible to rotate the blades and set them to any angle required, and then locking them in place.

In addition to the machines referred to, one of the N.1 D-29 C1's is exhibited, and also a small cabin machine belonging to the Compagnie Aérienne Française.

SOCIETE INDUSTRIELLE DES METAUX ET DU BOIS ("Ferbois")

GENERALLY known by the initial letters S.I.M.B. of its title, this firm has absorbed the old Adolphe Bernard company, its chief designer being M. J. Hubert, whose "Ferbois" all-metal monoplane was exhibited at the 1922 aero show. The machine shown this year, although somewhat similar in appearance, is of entirely different construction, being constructed mainly of wood. Thus, the fuselage is a wooden *monocoque*, and the wings also are covered with three-ply. The all-metal machine is, we understand, to be developed as a single-seater fighter, while the machine exhibited is the actual one used by Adjutant Chef Bonnet at Istres, when he estab-

lished a new French speed record by averaging 393 km./h. (246 m.p.h.) over the 3 km. course.

The "Ferbois" racer, type V.2, is shown in a photograph, and also, from a different point of view, in a sketch. The fuselage is of circular section at the maximum cross-section, flattening out to an oval shape at the stern. All wing and tail surfaces are faired into the fuselage by aluminium covers, and, altogether, everything possible has been done to reduce corners and everything that might add to the resistance. The undercarriage is quite different from that of the metal machine shown at the last exhibition, which was, it may be remembered, in the form of a single large central streamline "leg," into the lower end of which the axle fairing was built. On the V.2 there is a flat tapering leg on each side, made of multi-ply wood and coming almost to a point at the lower end. The divided axle works in a slot in the leg, and simple rubber shock-absorbers are used for springing the wheels.

The cantilever wings are of all-wood construction, and Lamblin radiators are fitted under the lower surface. The 450-600 Hispano-Suiza engine is entirely cowled-in, the streamlining being completed by a spinner over the propeller boss. Needless to say, the V.2 is by far the fastest machine in the show. The makers claim it to be the fastest machine in the world, but although this may be true, it still has to be proved.

The main dimensions are: Length o.a. 6.7 m. (22 ft.); height, 2.3 m. (7 ft. 6 ins.); wing span, 9.9 m. (32 ft. 6 ins.); wing area, 11.6 sq. m. (124.5 sq. ft.). Weight fully loaded, 1,175 kgs. (2,580 lbs.). Wing loading, 20.8 lbs./sq. ft.

(To be concluded.)

LIGHT 'PLANE CLUB DOINGS

PROGRESS is slowly but surely being made in the formation of the Light Aeroplane Clubs under the ægis of the Air Ministry, throughout various parts of the country. We propose publishing each week, under the above heading, secretarial notes as to the work being done by the various clubs, together with other items of general Light 'Plane Club interest.

For the benefit of those of our readers who may be interested in the Light 'Plane Club movement, we give below the names and addresses of the secretaries of six of these clubs which, it is hoped, will shortly be in active operation. From one of these—Newcastle-on-Tyne—we have received a few notes on the progress so far made, which we also publish.

We shall be pleased to have reports regularly from Club Secretaries, or those directly connected with new Light 'Plane Clubs, so that by keeping our readers informed on this matter the whole movement may be helped forward to the benefit of the clubs and the popularising of "that Air feeling."

Light 'Plane Clubs are being formed at:—

London.—Lieut. Com. H. Perrin, Secretary, Royal Aero Club, 3, Clifford Street, W.1.

Birmingham.—Major Gilbert Dennison, Secretary, Midland Aero Club, Handsworth.

Glasgow.—J. Allison, Esq., Jnr., 219, St. Vincent Street.

Lancashire.—C. J. Wood, Esq., Secretary, Lancashire Aero Club, c/o A. V. Roe and Co., Newton Heath, Manchester.

The S.B.A.C.

MR. T. O. M. SOPWITH, C.B.E. (H. G. Hawker Engineering Co., Ltd.), has been elected Chairman of the Society of British Aircraft Constructors for the year 1924-25, while Capt. P. D. Acland (Vickers, Ltd.) and Mr. H. T. Vane, C.B.E. (D. Napier and Son, Ltd.) have been elected Vice-Chairmen. Sqdn.-Commander James Bird (Supermarine Aviation Works, Ltd.) has been re-elected Hon. Treasurer of the Society. The Committee of Management have expressed to Mr. C. R. Fairey, M.B.E. (Fairey Aviation Co., Ltd.), their appreciation of his work as Chairman of the Society for the last two years and of the many services he has rendered to the industry during that period. Capt. P. D. Acland has already served as Vice-Chairman for some time, and the Committee of Management has recorded their thanks and appreciation in his case also.

R.A.F. Pilot Killed

As a result of an accident, at Upavon, to an Avro 504K of the Royal Air Force Central Flying School, on December 3, Pilot Officer Douglas Elphinstone Gaim, the pilot, was fatally injured and Denham Brown Waight was slightly injured.

An Important Judgment

An important decision concerning the responsibility of air transport companies has been given by a Paris Tribunal in connection with an accident to one of the cross-Channel

Newcastle-on-Tyne.—Alex. H. Bell, Esq., Hon. Sec., Newcastle-on-Tyne Light 'Plane Club, County Hotel.

Yorkshire.—Prof. G. Brodetsky, Yorkshire Aeroplane Club, Leeds University.

The Secretary of the Newcastle-on-Tyne Light 'Plane Club informs us that the Club has now been definitely formed and a Committee elected. The approval of the Air Ministry has been received, and the Club hopes to receive the subsidy, under the Light 'Plane Scheme, in due course.

Headquarters have been established at the County Hotel Newcastle, and two well-attended and enthusiastic meetings have already been held. A series of lectures, to commence immediately, is being arranged, and as many subjects relating to Aeronautics as possible will be covered. When the flying ground is prepared it is intended to form a glider section and a model section.

A very suitable site, just out of the City, has been selected as a flying ground, and negotiations regarding obtaining the use of it are in progress. The interest which the formation of the Club has aroused in the district is very gratifying.

The subscriptions to the Club are as follows: Flying Members, £3 3s.; Non-Flying Members, £2 2s.; Student Members, £1 1s. For each there is an entrance fee of a similar amount.

machines which fell into the sea off Folkestone on June 3, 1922, when the pilot and two passengers were killed.

Madame Carroll, the widow of one of the passengers, sued the French company to which the 'plane belonged for 500,000 francs damages. The Court decided that air companies have the same responsibilities towards their passengers as land and water transport companies, but since the pilot of the machine in question was in good health, and since the aeroplane itself was in good working order, the mishap was purely accidental, and consequently the company could not be held responsible, and the claim was therefore rejected.

Roumanian Royal Aero Club's New Headquarters

THE Royal Aero Club of Roumania has now moved into new headquarters, as follows: 9, Rue Clemenceau, Bucharest. The General Secretary of the Club is Lt.-Col. Aviateur Andre Popovici.

R.A.F. Boxing for Wakefield Trophies

FOR the second year in succession Kenley has won the trophies presented by Sir Charles Wakefield for the boxing competitions, which took place last week. The points gained by the various stations were as follows:—*Officers*: Kenley, 21; Spittlegate, 11; Andover, 10; Henlow, 9; Northolt, 7. *Airmen*: Kenley, 42; Andover, 33; Halton, 31; Henlow, 26; Northolt, 23; Spittlegate, 21; Cranwell, 21; Shrewsbury, 16; Lee-on-Solent, 13; Uxbridge, 13; Leuchars, 6.

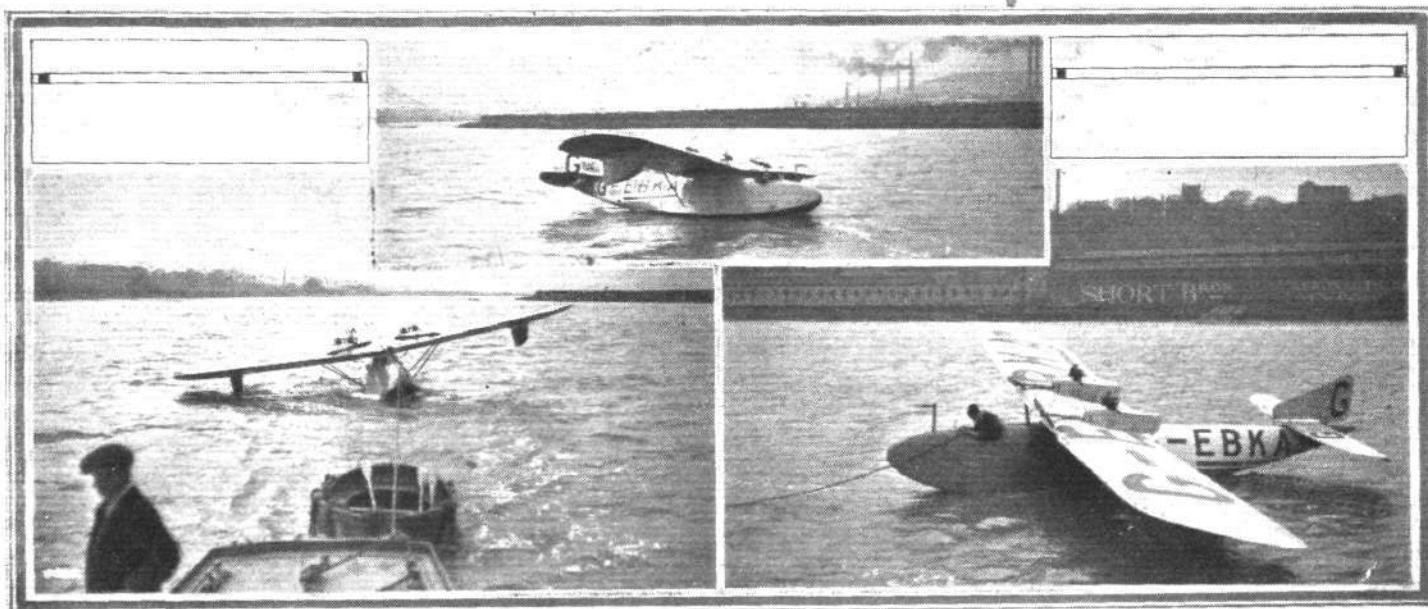
SHORT BROS. AND METAL CONSTRUCTION

MANY Aircraft constructors, both at home and abroad, are now giving the all-metal aeroplane serious consideration, when but a few years ago metal construction was looked upon with disfavour—and perhaps with fear—by a large proportion of designers. As far back as 1920, however, Messrs. Short Bros.—one of the pioneer aeronautical firms, and certainly the oldest established builders of aeroplanes in this country—had the courage of their convictions and produced an all-metal aeroplane. This machine, the Short "Swallow," made its first appearance at the Olympia Aero Show of 1920, where it created a considerable amount of interest.

The "Swallow" was the outcome of the firm's extensive experience in the construction of rigid airships, in which form of construction, using light aluminium alloys, they saw great possibilities in its application to aeroplanes. The "Swallow" was an orthodox single-seater fuselage-tractor-biplane of the two-bay type, fitted with a Siddeley "Puma" engine. Duralumin was employed in its construction practically throughout, exceptions being in the wing spars and certain of the minor parts (struts, etc.), where steel was used. The

construction, more or less, followed that of the "Silver Streak." Short Bros. continued their experiments in metal construction, and towards the end of 1923 they put in hand the extremely interesting all-metal light flying boat which is the subject of the accompanying illustrations. We do not propose to give a description of this machine here, for we gave a fairly full report on it, together with general arrangement drawings, in *FLIGHT* for April 17, 1924. The Short light flying boat is interesting, not only on account of its metal construction (at present the wings are fabric covered, but we believe sheet metal will be employed as the covering in the future), but because it forms one of the first examples of the application of metal construction to flying boats produced in this country. Furthermore, it is also the first light "waterplane" to be built, if not in the world, in England.

Just at the moment this machine is undergoing its trials, and the three accompanying views show the boat on the water at Rochester during one such occasion recently. We may remind our readers that it is fitted with two 696 c.c. Blackburne engines, mounted on the wings, one on each side of the hull, and driving tractor air screws direct. Except, as pre-



THE SHORT ALL-METAL LIGHT FLYING BOAT: Three views of this interesting example of metal construction undergoing tests at Rochester. At the top it is seen taxiing; on the left, it is being towed by a motor boat; and on the right it is being moored.

fuselage consisted of a framework of transverse oval rings or formers, bulkheads and longitudinals of channel section Duralumin. Riveted to this framework was a covering of thin sheet Duralumin, applied in a number of strips or sheets overlapping circumferentially and joined along the top and bottom centre lines of the fuselage. The result was a fuselage similar to the wooden *monocoque* type.

The wings were built up on tubular steel spars, with sheet Duralumin ribs, the whole being covered with sheet Duralumin, stiffened at intervals by small fluting.

As a whole, the all-metal short "Swallow" proved entirely successful, and early in 1921, re-named the "Silver Streak," it was purchased by the Air Ministry with the object of a thorough "try-out." As a result of these tests an order was placed for further all-metal machines. The Short "Springbok" therefore, made its appearance in 1923. Being a Service machine, details are naturally unavailable, and we can only state that it was a two-seater fighter tractor biplane (not unlike the "Bristol Fighter in general appearance) fitted with a 400 h.p. Bristol "Jupiter," and that its con-

struction, more or less, followed that of the "Silver Streak." The results of the tests with this remarkable little machine will, we know, be awaited with interest.

Before concluding our remarks on Messrs. Short Bros.' activities in metal construction, reference should be made to the Short "Satellite"—a two-seater light 'plane, fitted with a Bristol "Cherub" engine. This also is constructed of metal, except for the wing covering, and was one of the machines entered for the recent two-seater light 'plane competitions. A fully illustrated description of the "Satellite," together with general arrangement drawings, appeared in *FLIGHT* for July 24 and September 25, 1924, so we need not say more here than that it is a two-seater monoplane of normal type, and that, although it suffered from a fit of sulks on the occasion of the light 'plane competitions, it flies remarkably well.

Thus it will be seen that our old-established aeronautical firm of Short Bros. has done good work in connection with metal construction as applied to aircraft, and we may reasonably expect great things from them in this way in the future.



Sir Sefton Brancker's Air Tour

As reported last week, the Director of Civil Aviation, Sir Sefton Brancker, had to journey to Bucharest from Warsaw by rail, as fog and snow prevented flying. Later, however, Alan Cobham was able to fly the D.H.50 over to Bucharest, and on December 5 they continued their journey, by air, to Constantinople.

Sydney Air Carnival

THE Australian Aero Club is delighted by the performance of the Australian-built light aeroplanes which took part in an aerial carnival at Richmond Aerodrome, Sydney, last week. One of the most successful is a biplane, with a 30 h.p. engine, designed by Mr. H. E. Broadsmith, formerly with the Avro Co.

THE ROYAL AIR FORCE

London Gazette, December 2, 1924.

General Duties Branch

Flight Cadet G. H. Loughman, having successfully passed through the R.A.F. (Cadet) College, is granted permanent commn. as Pilot Officer, with effect from and with sen. of Oct. 31; Flying Officer C. McC. Vincent, D.F.C., is granted a permanent commn. in rank stated (Dec. 3); G. S. White is granted a short-service commn. as a Flying Officer with effect from and with sen. of Nov. 24. The follg. Pilot Officers are promoted to rank of Flying Officer:—C. J. Pooley, A. E. Stewart (April 2); W. P. Wiltshire, B. H. Shaw (June 2);

G. H. Rawlinson, H. J. Storey (Aug. 13). Flight-Lieut. L. W. Jarvis is placed on half-pay, Scale B (Nov. 20).

The follg. are transferred to the Reserve, Class C.:—Flight Lieuts.—H. H. Clarke (Nov. 28); C. H. Tancred, O.B.E. (Dec. 3). Flying Officer W. R. Rogers (Nov. 28).

Flying Officer O. C. Noel (Lt., Indian Army, ret'd.), resigns his short-service commn. (Dec. 1); Pilot Officer R. P. Keely resigns his short service commn. (Dec. 1); Pilot Officer D. K. Power is dismissed the service by sentence of General Court Martial (Nov. 20).

ROYAL AIR FORCE INTELLIGENCE

Appointments. The following appointments in the R.A.F. are notified:—
General Duties Branch

Flying Officers:—G. H. Mills and R. D. Whelan, to No. 12 Sqn., Andover, on transfer to Home Estab. 18.10.24. J. G. Hawtrey, to No. 11 Sqn., Netheravon, on transfer to Home Estab. 18.10.24. R. B. Jordan, to No. 2 Sqn., Manston. 9.12.24. R. J. Copley, to R.A.F. Depot, on transfer to Home Estab. 19.11.24. R. J. Copley, to Air Ministry. 1.12.24. G. Lambourne, to H.Q., Egypt. 1.12.24. C. J. Collingwood, to R.A.F. Depot, on transfer to Home Estab. 1.11.24. W. N. Pledierleith, to Marine Aircraft Experimental Estab., Felixtowe. 18.12.24. A. Blackwell, to No. 1 Sch. of Tech. Training (Boys), Halton, on transfer to Home Estab. 12.12.24. E. F. Mattock, to No. 32 Sqn., Kenley, on transfer to Home Estab. 13.12.24. J. J. Comerford, to No. 41 Sqn., Northolt. 16.12.24. F. Porter, J. S. Nichol, F. W. Foster, D.F.C., D.S.M., R. Stiven, Hon. F./Lt. J. C. E. A. Johnson and J. R. Brown, to Electrical and Wireless Sch., Flowerdown. 1.12.24. G. S. White, to R.A.F. Depot, on appointment to a Short Service Comm. 24.11.24. L. S. Hamilton and A. B. Smith, M.C., to No. 2 Sqn., Manston. 15.12.24. V. Harris, to No. 3 Sqn., Upavon. 15.12.24.
Pilot Officers:—H.M.S. Wright, to Armament and Gunnery Sch., Eastchurch. 26.11.24. H. L. R. Gough, to No. 13 Sqn., Andover. 1.12.24. C. H. P. Morgan, to No. 11 Sqn., Netheravon. 2.12.24. The following are all posted with effect from 15.12.24:—L. W. C. Annable, S. E. Bulloch, A. F. Hutton, G. W. P. Irwin, F. W. Moxam and D. Robinson, to No. 4 Sqn., S. Farnborough. E. C. Boucher and E. H. Fielden, to No. 25 Sqn., Hawkinge. R. W. E. Bryant and P. P. Grey, to No. 41 Sqn., Northolt; J. E. Clayton

and F. F. Wilkinson, to No. 19 Sqn., Duxford. R. K. Coupland, H. T. R. Cripps, G. R. Jennings-Bramly, J. C. Mancy, J. F. Nicholas and C. F. Steventon, to No. 13 Sqn., Andover. P. Cranswick, M.C., to No. 3 Sqn., Upavon. T. R. Finney and D. W. J. Meagher, to No. 111 Sqn., Duxford. L. R. Gladwin-Errington and A. E. P. Smith, to No. 17 Sqn., Hawkinge. G. D. Green, G. W. R. Russell and V. W. Soltan, to No. 2 Sqn., Manston, J. Summers and W. A. Tattersall, to No. 29 Sqn., Duxford.

Stores Branch

Squadron Leader F. A. Baldwin, to H.Q., Egypt. 1.12.24.

Medical Branch

Group Captain H. Cooper, D.S.O., B.A., to R.A.F. Depot, on transfer to Home Estab. 18.10.24.

Wing Commanders:—H. A. Treadgold, M.D., B.A., to R.A.F. Depot, on transfer to Home Estab. 18.10.24. A. S. Glynn, M.B., to R.A.F. Depot (Non-effective Pool), on transfer to Home Estab. 14.11.24.

Squadron Leaders:—H. B. Porteous, M.B., to H.Q., Inland Area. 28.11.24. J. Rothwell, M.B., to No. 7 Group H.Q., Andover. 28.11.24. D. Blair (Dental), to R.A.F. Depot, on transfer to Home Estab. 1.11.24.

Flight Lieutenants:—T. J. Thomas, M.B., A. Briscoe, M.B., and R. Boog-Watson, M.B., D.P.H., to R.A.F. Depot, on transfer to Home Estab. 18.10.24. C. McC. Jones, M.A., to R.A.F. Depot, on transfer to Home Estab. 1.11.24.

Flying Officers:—W. A. Beck, M.B., D.P.H., and J. Parry-Evans, to Research Lab. and Medical Officers' Sch. of Instruction, Hampstead, on appointment to Short Service Comms. for short course. 19.11.24.

SIR SAMUEL HOARE ON THE GOVERNMENT'S AIR POLICY

At the Air Ministry on December 3 last, Sir Samuel Hoare, Secretary of State for Air, gave to representatives of the Press a "bird's-eye view" of the air policy which would be followed by the Government in strengthening the Home Defence Air Force, extending and encouraging civil aviation, etc. At the outset Sir Samuel pointed out that the expansion programme today did not differ conspicuously from that laid down by himself a year and a half ago, and he expressed satisfaction at the fact that there had been continuity of policy during the régime of the late Government. He hoped very earnestly that air policy would never be hampered by party conflict, as it was a matter of supreme Imperial importance.

The expansion programme of the Ministry, Sir Samuel stated, would be one under which, in the course of a few years, 52 air squadrons were to be formed in this country for home defence, and he hoped to see 18 of these squadrons fully formed by the end of this year.

The non-regular side of the Force—i.e., the auxiliary Air Force squadrons and the special reserve squadrons—was, he said, also under way, and he hoped in the course of the next year we would have about five non-regular squadrons formed, which indicated that the expansion programme was going ahead.

An outward and visible sign of this extension in progress was the appointment (from January 1 next) of Air-Marshal Sir John Salmond as Commander-in-Chief for the air defence of Great Britain, and, as far as he could see at the moment, the first auxiliary and special reserves would be formed in connection with the Territorial associations for counties and cities.

Referring to the value of aeroplanes in regard to military operations, particularly in Iraq, Sir Samuel said: "The air command in Iraq has been a very remarkable success; in very difficult circumstances we have maintained order. We have had very little trouble there, and we have managed to do this with what would have been regarded as a very small garrison before the advent of air power."

As regards civil aviation, Sir Samuel thought there was every reason to believe that it would make good progress, though, as with the military side, there was no conspicuous development to note compared with what obtained eighteen months ago. The Imperial Airways Co., Ltd., which was operating continental services, was apparently going on satisfactorily, although it was too early to judge, as they only started last spring.

Sir Samuel then went on to say that a particularly important matter just now was the extension of the civil routes to Prague.

It was important, for one reason, because the capital of Czechoslovakia was the geographical centre of Europe. He had always been anxious to get the British air routes extended to Prague, but this had been held up by the difficulties, under the Versailles Treaty, as regards flying over Germany. He hoped these difficulties would eventually be removed. The aim he constantly had in view was the eventual extension of the air routes to India, and even Australia. He certainly regarded this matter as one of the big objects that the Government had to keep before it during the next three or four years. We were already making some measure of progress, and Sir Sefton Brancker was at the moment carrying out investigations on the spot.

"Connected with this matter," said Sir Samuel, "is another side of the problem—that of airships; and there, again, we are making a serious attempt to get an airship route started between this country and India. It is a very big project that we must develop with caution and without undue haste, but we are definitely embarked upon it. In our minds this is one of the matters of most enormous importance in the whole field of civil aviation, for if we could get an Imperial air route started it would influence our Imperial life in many directions. There is, of course, the trade aspect, and another important point is that such a service would make possible closer and quicker intercourse between the Ministers of the Dominions and the Ministers of this country. It is not too much to say that many of the Imperial problems with which we are faced could be much more easily and more expeditiously solved if we had in operation an air service between London, Bombay, and Melbourne."

Sir Samuel then referred to the matter of the Light 'Plane Clubs, which, if they could be got going, would mean a tremendous advance in the national knowledge of aviation. It was expected that the first six districts to possess these clubs would be London, Birmingham, Manchester, Leeds, Newcastle, and Glasgow.

The Air Ministry was now, he said, engaged in various experiments with a view to deciding upon the best machines for civil routes. They had purchased and handed over to Imperial Airways a new three-engined Handley Page, and they had also placed orders for two three-engined passenger machines for service in the East—an Armstrong and a Hawker—as well as for a number of experimental machines.

Experiments were being carried out with a view to improving the air port of Croydon—including experiments with the Loth guiding cable (described in FLIGHT for December 27, 1923)—besides improvements to other aerodromes.

THE D.H.54 COMMERCIAL BIPLANE

A New De Havilland Machine Under Construction

WE are able this week to give some brief preliminary particulars of a new commercial machine now under construction at the De Havilland Aircraft Co.'s works at Stag Lane Aerodrome, Edgware, for the British Air Ministry.

This machine, which is known as the D.H.54, is a normal tractor biplane, fitted with a 650 h.p. Rolls-Royce "Condor" engine, following the usual De Havilland practice.

Accommodation is provided for 14 passengers in a large, light and airy cabin. The height of the cabin is ample for even the tallest man to stand upright, and the gangway is of sufficient width to allow free movement for the whole length of the cabin. Separate armchairs for passengers are arranged three abreast all facing forward, and each passenger has a wide field of view through safety glass windows. Special attention has been paid to the provision of adequate ventilation and heating arrangements.

The pilot and navigator are located forward of the main planes, and both have an excellent and uninterrupted view. Luggage is carried in a large hold located under the pilot's and navigator's cockpit, which is entirely separate from the cabin.

The D.H.54 will be fitted with the De Havilland automatic variable wing camber device, which enables aircraft to "take off" after a shorter run, and reduces the length of run on landing by reason of the low flying speed when throttled down which it imparts to the machine to which it is fitted.

The fuselage is built on the usual De Havilland rigid system of construction, eliminating all bracing wires and ensuring longevity and accuracy. To facilitate storage or packing, it is built in two halves which are secured together by bolts. A novel feature is the oleo-rubber in compression undercarriage, which—in the case of an unavoidable forced descent in water—can be jettisoned. Dropping the undercarriage in this emergency reduces to a minimum the risk of overturning on alighting, while the machine is so constructed that it will float for several hours without submerging.

It is expected that the D.H.54 will be ready for trials in January next. The main dimensions, etc., are as follows: Span, 68 ft.; length, 51 ft.; height, 16 ft.; weight fully loaded, 11,000 lbs.; top speed, 110 m.p.h.; cruising speed, 100 m.p.h.; landing speed, 52 m.p.h.; range, 4½ hours.

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PERSONALS

Married

FIDDAMENT—WARD.—November 25, Flight-Lieut. A. L. FIDDAMENT, D.F.C., No. 100 (Bombing) Squadron, R.A.F., to DORIS MARTHA, daughter of Mrs. WARD, Lincoln, and the late Mr. J. W. WARD, Withcall House, Louth.

Flight-Lieut. FRANK WRIGHT, R.A.F., eldest son of Mr. and Mrs. Wright, of Royston, Herts, was married on November 26, at St. Peter's, Cranley Gardens, to MARY FAITH, daughter of Mr. and Mrs. W. H. HARRISON, of 8, Glebe Place, Chelsea.

To be Married

The engagement is announced between Flying Officer S. L. HOPE POTTER, son of the late Dr. John Hope Potter, of Porlock, Somerset, and nephew of Archdeacon Beresford Potter, of Rake Manor, Melford, Surrey, and DOROTHY, the daughter of Mr. S. PATTINSON, J.P., and Mrs. PATTINSON, Westholme, Sleaford.

The engagement is announced of Capt. J. B. WALMSLEY, D.F.C., barrister-at-law, only son of Mr. T. J. Walmsley, Beechfield, Calderstones, Liverpool, and DOROTHY MAUD, eldest daughter of the late George S. BLEASDALE and Mrs. BLEASDALE, Mossley Hill, Liverpool.

The engagement is announced between ROBERT DARLEY WHELAN, R.A.F., eldest son of the Rev. P. S. and Mrs. Whelan, of Brenchley, Kent and BARBARA MARION CELIA WREY, younger daughter of Sir BOURCHIER and Lady WREY, of Tawsden, Brenchley.

Dr. H. C. Watts

DR. H. C. WATTS informs us that, following the voluntary liquidation of Messrs. Ogilvie and Partners, Ltd., he is continuing his side of that business as a consultant in aerodynamic matters generally, and in particular on all matters connected with the design and operation of marine and air screws. Will readers please note his business address is now 3, Grosvenor Gardens, London, S.W. 1, and the telephone number Streatham 4636.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS

A CLUB meeting of the above Society will be held at the Y.M.C.A., Tottenham Court Road, W., at 7.30 p.m. on Tuesday, December 16th.

A preliminary announcement will be made of the Research Committee's competitions for 1925. Three very interesting contests are foreshadowed, and for these your consent will be asked for the allocation of three of the Society's cups as prizes.

Coffee will be served at 9 p.m., after which Mr. W. E. Evans will give a chat on "Taking Snapshots and Photos. with a No. 2 Brownie Camera." Come and bring a friend (lady or gentleman) with you.

A. E. JONES, *Hon. Sec.*

48, Narcissus Road,
West Hampstead, N.W. 6.

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SIDE-WIND

THE employes of Messrs. George Parnall and Co. held their third annual dinner at the Crown Hotel, Bristol, on the 5th instant. Mr. George G. Parnall presided over a large company, and, in the course of the usual toasts and speeches of such an occasion, reference was made to absent friends, and to the continued growth and expansion of the business. The toasts included H.M. the King, the Firm, the A.I.D. and the Sports Club. Mr. Parnall, in replying for the firm, mentioned their imminent extension to, and occupation of, Yate Aerodrome, where they would have every facility for the furtherance of efficient aeronautical work, and the excellent buildings of which would provide five or six times the floor space of their four factories at present occupied in Bristol. All the guests spent a very pleasant and enjoyable time, and each voted it even better than last year, thanks to the energies of the organising committee. The humorous and musical programme arranged by the promoters added to the success of the evening, and was ably contributed to by members of the staff. The firm's test pilot, Mr. F. T. Courtney, and the London representatives and staff, were unavoidably prevented from being present.

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AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1923

Published December 11, 1924

- 20,491. M. ADAMCZIK. Landing apparatus of aircraft. (224,589.)
- 20,688. C. G. NEVATT. I.c. rotary engines. (224,599.)
- 20,689. C. G. NEVATT. Cooling and lubrication of i.c. rotary engines. (224,600.)
- 20,690. C. G. NEVATT. Pistons for rotary i.c. engines. (224,601.)
- 20,801. A. J. JENKINS. Device to enable pilot to ascertain his position or course. (224,604.)

Owing to the Christmas Holidays, all Editorial and Advertisement matter for the issue dated December 25 must reach the offices of FLIGHT, 36, Great Queen Street, Kingsway, W.C. 2, by first post on Saturday, December 20.

FLIGHT

The Aircraft Engineer and Airships

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